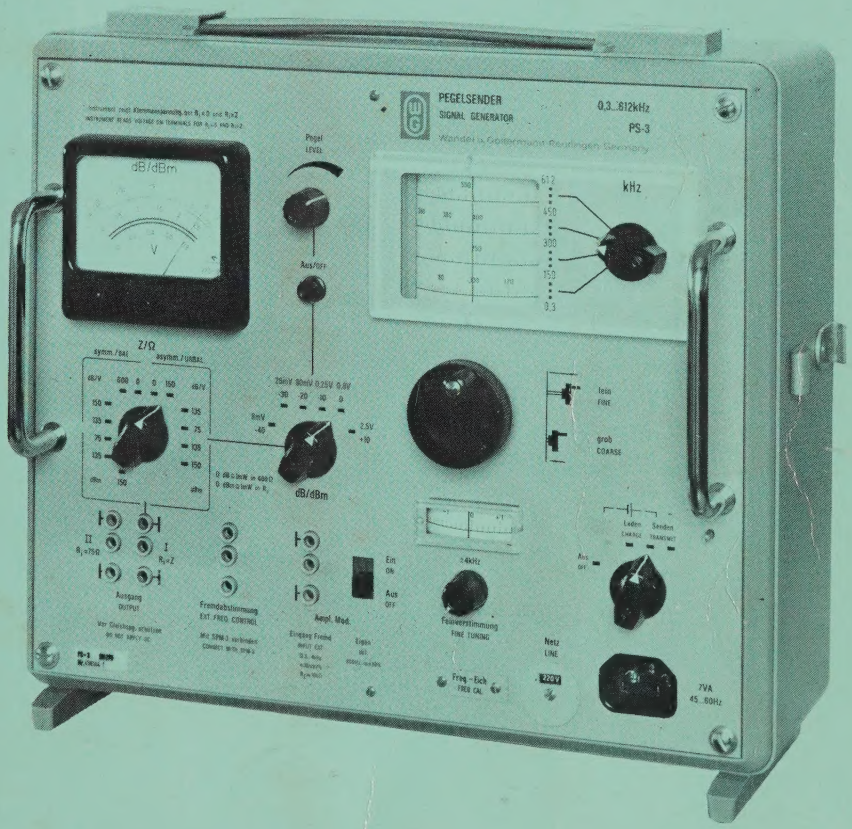
Description and Operating Manual



Signal Generator

for the frequency range of 300 Hz to 612 kHz

PS-3

MP MASTER
MA24480
RE LTD

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SIGNAL GENERATOR PS-3

Frequency range 0.3 kHz to 612 kHz

Description and Operating Manual T ...

BN 270 dB/dBm/V

1.7.66

0.2.7.74 2138 GN v. 1823

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Wandel u. Goltermann · Reutlingen/Germany

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1 INTRODUCTION

The Signal Generator PS-3 shown in Fig. 1 is primarily used for measurements in the operation of balanced carrier systems. It covers the frequency range involved, 0.3 to 612 kHz, and supplies the necessary levels as voltage or power levels.

The generator is completely transistorized and therefore ready for operation as soon as it is switched on. Its functions are based on the well-known beat-frequency principle. Apart from the usual power-line operation the built-in nickel-cadmium storage battery permits battery operation.

The Signal Generator PS-3 can be used in conjunction with the selective Level Meter SPM-3 in such a way that the generator frequency can be adjusted on the Level Meter only. Both sets thus form a test setup that is easily controlled and can be used for virtually any attenuation measurement in the frequency range indicated.

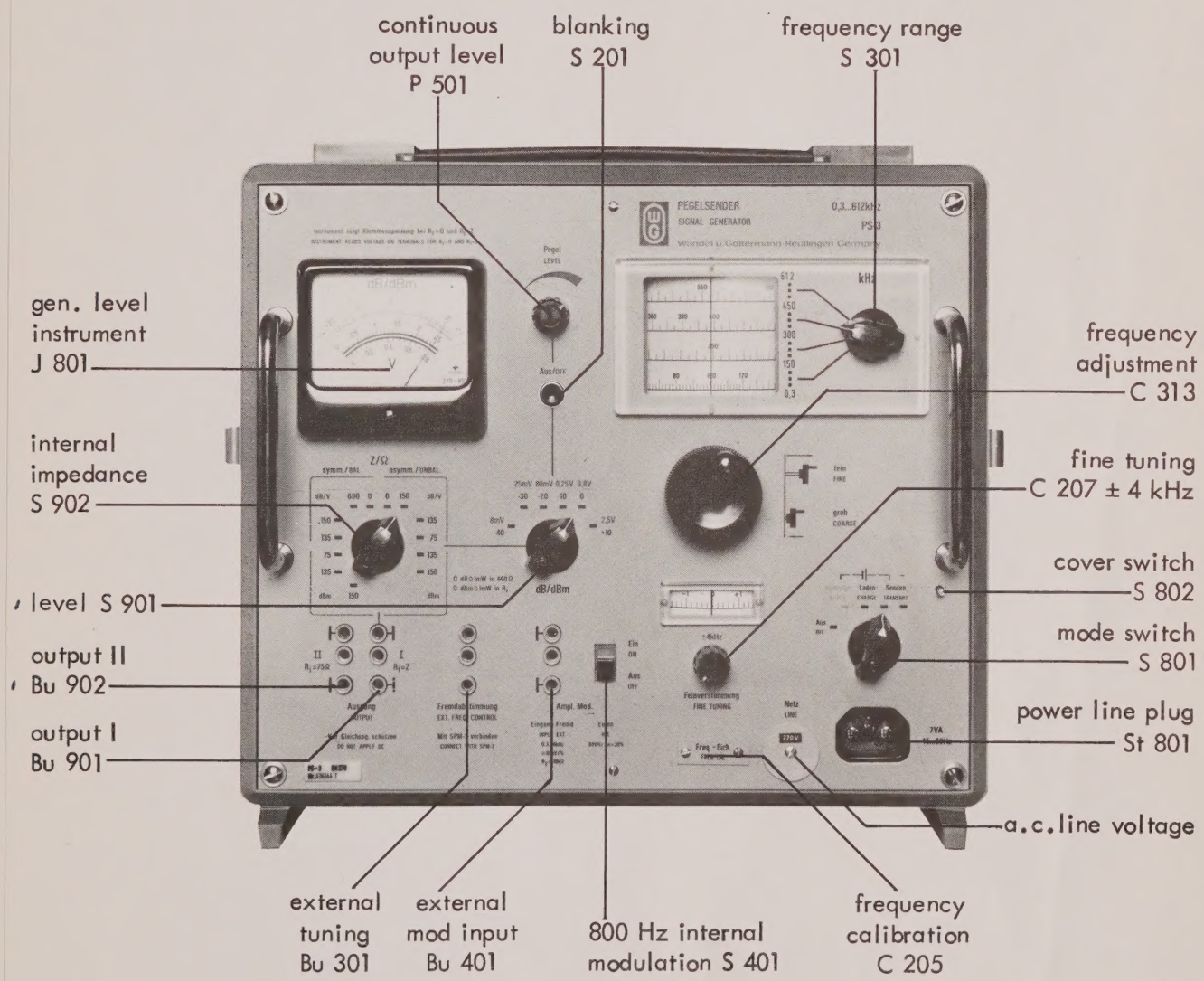


Fig. 1 Signal Generator PS-3

S-2 3 PIN BALANCE (PLUG).

2. SPECIFICATIONS

The specifications apply to an ambient temperature of + 20 °C and either for a battery voltage within the rated range of use or one of the mains voltages which may fluctuate by ± 10 %.

2.1. Frequency

2.1.1. Range . . . . . 0.3 to 612 kHz

subdivided in 4 ranges . . . . . 0.3 to 150 kHz, 150 to 300 kHz
300 to 450 kHz, 450 to 612 kHz

continuous fine tuning . . . . . ± 4 kHz

2.1.2. Accuracy

coarse-scale ranges after zero adjustment

between 4 and 20 kHz . . . . . max. ± 500 Hz
between 20 and 100 kHz . . . . . max. ± 1000 Hz
between 100 and 612 kHz . . . . . max. ± 0.2 % ± 1000 Hz

fine scale range after zero adjustment . . . . . max. ± 70 Hz

temperature dependence in range 0 to + 40 °C. . . max. $2 \cdot 10^{-4}$ ± 100 Hz per °C

effect of ± 10 % line-voltage or battery voltage fluctuation within the operating range . . . . . max. ± 1 Hz

2.2. Output Level at Output I

2.2.1. Selectable source impedance

for voltage levels in dB

balanced output . . . . . approx. 0, 135, 150, 600 Ω

unbalanced output . . . . . 0, 75, 135, 150 Ω

for voltage levels in dBm

balanced output . . . . . 135, 150 Ω

unbalanced output . . . . . 75, 135, 150 Ω

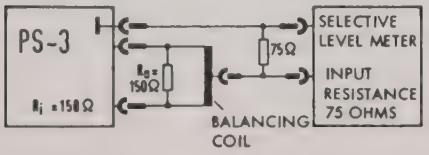
2.2.2. Generator signal balance ratio of output level [1]

when R_i = char. impedance Z = 150 Ω . . . . . min. 43 dB

---

1) The generator signal balance ratio of the output voltage is measured as follows :

Rule: ground balance = generator level - receive level - 6 dB



2.2.3 Adjustable levels and voltages

voltage level adjustable in 10 dB-steps

when output balanced or unbalanced and

Ri approaches 0, Z =min. 75 Ω or
Ri = Z = 135, 150, 600 Ω (dB/volt range) . . . . . -40 dB to +10 dB

when output unbalanced and
Ri = Z = 75 Ω (dB/volt range) . . . . . -40 dB to 0 dB

power levels adjustable in 10 dBm-steps [1]

when output balanced or unbalanced and
Ri = Z = 135, 150 Ω (dBm range) . . . . . -40 dBm to +10 dBm

when output unbalanced and
Ri = Z = 75 Ω (dBm range) . . . . . -40 dBm to 0 dBm

voltage adjustable in steps when output balanced or unbalanced and
Ri = approx. 0, Z = min. 75 Ω or
Ri = Z = 135, 150, 600 Ω (dB/volt range) . . . . . 8 mV to 2.5 V

when output unbalanced and
Ri = Z = 75 Ω (dB/volt range) . . . . . 8 mV to 0.8 V

2.2.4 Measuring range of the instrument

voltage level. . . . . -20 dB to +1 dB

power level . . . . . -20 dBm to +1 dBm

voltage . . . . . 0 to 2.7 V
0 to 0.85 V

2.2.5 Output level accuracy

accuracy of measurement when
Ri = approx. 0, Z = min. 135 Ω in
range 0 dB (0 dBm) and 20 kHz . . . . . max. ±2% of full-scale value

---

1) The power level depends on the internal resistance Ri switched in. It indicates the voltage providing a power of 1 mW across the connected impedance Z.

Ri = Z = 75 Ω 0 dBm correspond to 0.274 V
= 135 Ω 0 dBm correspond to 0.367 V
= 150 Ω 0 dBm correspond to 0.387 V

attenuator accuracy in all level ranges when
Ri = approx. 0, at 20 kHz . . . . . max. ± 0.1 dB

additional error when
Ri = Z at 20 kHz

-40 dB to 0 dB . . . . . .max. ± 0.05 dB
at + 10 dB . . . . . .± 0.1 dB

-40 dBm to 0 dBm . . . . . max. ± 0.1 dB
at + 10 dBm . . . . . .max. ± 0.15 dB

frequency response referred to 20 kHz

-40 dB (dBm) to 0 dB (dBm) . . . . . max. ± 0.2 dB
at +10 dB (dBm) . . . . . max. ± 0.3 dB

change of output level indicated when frequency
is changed, P 501 unchanged
referred to 20 kHz [1] . . . . . max. ± 0.5 dB

change of output level in the range 0 to +40°C
adjustments unchanged . . . . . max. ± 0.15 dB/10°C

change of output level for line voltage
fluctuations of ± 10%
position of P 501 unchanged . . . . . .± 0.1 dB

change of output level

when battery voltage varies within operating range
position of P 501 unchanged . . . . . max. ± 0.2 dB

2.3 Distortion Coefficient and Attenuation of Non-harmonic Noise Voltage

2.3.1 Distortion coefficient for
20 kHz, 0 dB, Ri = 0, Z = min. 75 Ω. . . . . max. 1 %

2.3.2 Attenuation of non-harmonic noise voltage

at frequencies less than 612 kHz . . . . . min. 60 dB
at frequencies greater than 612 kHz . . . . . min. 52 dB

2.4 Amplitude Modulation

2.4.1 External modulation. . . . . 0.3 kHz to 4 kHz

depth of modulation m . . . . . 0 to 70 %

modulation distortion at m = 30 %. . . . . max. 3 %

modulating voltage per % . . . . . 10 mV

---

[1] This value applies only to the frequency range 0.3 to 600 kHz

2.4.2. Internal modulating frequency . . . . . 800 Hz ± 80 Hz

depth of modulation . . . . . 30 %

2.5. Power supply

2.5.1. Power-line operation
permissible line voltage . . . . . 110, 115, 220, or 240 V

line frequency [1]
power consumption when operating
or charging . . . . . 7 W

2.5.2. Battery operation

three batteries, type . . . . . DEAC 5/500 DKZ

mean battery voltage . . . . . 18 V

total battery capacity . . . . . .0.5 Ah

hours of operation without recharging 8

recharging time in hours 14

2.6. Output II

Output impedance . . . . . 75 Ω ± 1.5 %

Output voltage level, open circuit,
with meter reading 0 dB . . . . . - 10 dB ± 0.2 dB

With other meter readings, the reading also includes this value.

Power level with meter reading 0 dB

for Z = 75 Ω . . . . . - 19 dB ± 0.2 dB

135 Ω . . . . . - 16,5 dB ± 0.2 dB

150 Ω . . . . . - 16 dB ± 0.2 dB

With other meter readings, the reading also includes this value.

2.7. Miscellaneous

2.7.1. Rated range of use . . . . . - 10° to + 50 °C

Limit range for storage . . . . . - 20° to + 60 °C

2.7.2. Dimensions and weight

dimensions with cover (width x height x depth) . . . . . 342 x 286 x 175 mm

weight . . . . . .7.5 kg

1) At 45 Hz, the line voltage must not be exceeded

Subject to change without notice

3 DESIGN DETAILS AND OPERATION

The frequency generation and the signal path will be explained in the sections to follow with the aid of Fig. 2. Details of the circuits mentioned may be taken from the circuit diagrams attached.

3.1 Frequency Generation

This beat-frequency generator forms its operating frequency 0.3 to 612 kHz from the difference between two oscillator frequencies, both oscillating above the operating frequency. One of them is the carrier oscillator; it generates frequencies between 650.3 and 1262 kHz. The signal oscillator generates the second frequency of 650 kHz. This frequency can be varied by ± 4 kHz.

The voltages of these two LC oscillators are applied via buffer stages to the primary modulator II. This ring modulator is controlled by the square-wave voltage of the carrier oscillator. From the frequency mixture appearing across the modulator output, the low-pass filter network LPFL II filters out the difference frequency which forms the frequency of the level signal generator 0.3 to 612 kHz.

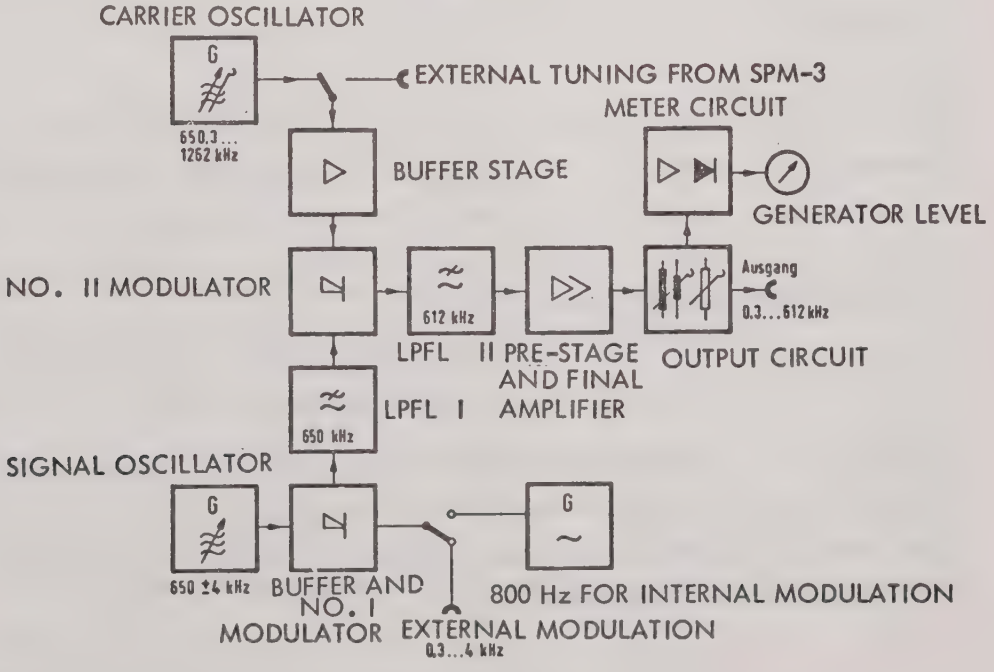


Fig. 2 Block Diagram of the Signal Generator PS-3

The stability and the non-linear distortion of the generator voltage in the frequency range 0.3 to 612 kHz across the Modulator II output are substantially determined by the signal oscillator because

a) the stabilized alternating voltage of the signal oscillator results in a frequency-independent generator voltage and

b) the LPFL I following the signal oscillator, suppresses the harmonics of the signal voltage, thus reducing the non-linear distortion.

3.2 Amplifier and Output Circuit

The pre-stage following the LPFL II serves as a impedance converter. The generator-level potentiometer P 501 is therefore supplied from a low-resistance source. The output amplifier with high negative feedback increases the potentiometer output voltage to the level required for the output circuit. Moreover, the amplifier has a negligibly small output impedance so that the switchable internal resistances of the generator, mounted in the output circuit, are in no way influenced.

The output circuit comprises transformer-type attenuators switchable in steps of 10 dB. The output level thus available is in the range -40 dB to +10 dB or -40 dBm to +10 dBm. Intermediate values can be continuously adjusted with the said generator-level potentiometer P 501.

Apart from the absolute voltage level of 0 dB corresponding to 0.775 V which is independent of the switchable internal resistance Ri of the generator, the set supplies also the absolute power level. This level changes with the internal resistance. For instance, the power level is 0 dBm corresponding to 0.387 V if the internal resistance is Ri = Z = 150 Ω. Additional data are given in Section 4.4.

The power level is switched with the Ri switch that controls an attenuator in the output of the LPFL II and the input of the instrument circuit (see block diagram in the appendix).

The meter circuit comprises a wideband amplifier stage with a high negative feedback which has the large output impedance required for the mean-value rectifier. This stage works into an arithmetic mean-value rectifier. The reading is obtained as an rms value to which the set is calibrated.

3.3 External Control

The desired operating frequency f_s of the generator is normally adjusted by changing the carrier frequency f_Ω (Fig. 2). If the Signal Generator PS-3 is used in conjunction with the selective Level Meter SPM-3, then the variable carrier oscillator in the SPM-3 can substitute the carrier oscillator in the generator via an additional external-control transmission line. Fig. 3 shows the principle of this external control.

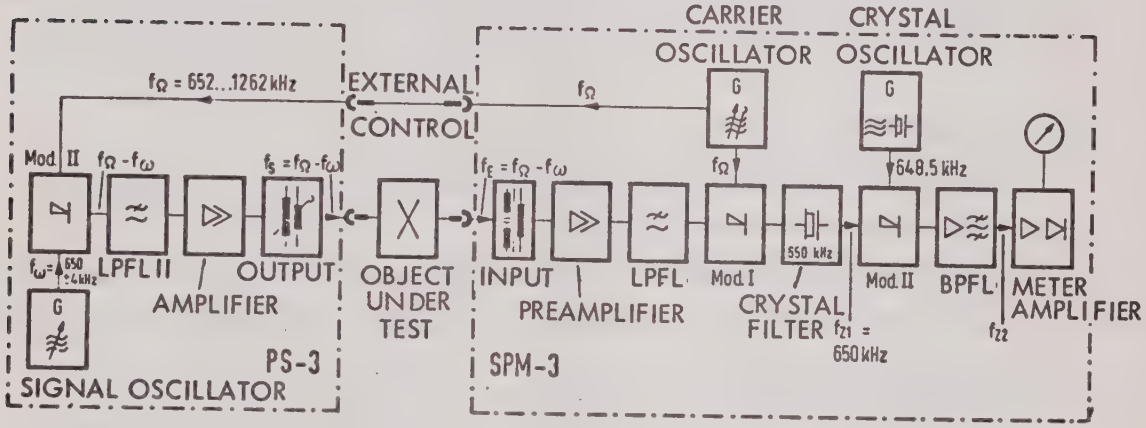


Fig. 3 Principle of external control

The generator supplies the frequency f_s equal to the receive frequency so that

$$f_s = f_\Omega - f_\omega = f_{in} \qquad (1)$$

Since the selective Level Meter SPM-3 is also operating on the beat-frequency principle, the following is true of its 1st intermediate frequency IF:

$$1st\ IF = f_\Omega - f_{in} = 650\ kHz \qquad (2)$$

When (1) is substituted in (2), we have $f_\omega = 650$ kHz = 1st IF

Result:

If the frequency f_ω of the signal oscillator equals the 1st IF, the generator frequency needs only to be adjusted with the selective Level Meter SPM-3.

This simplified frequency adjustment facilitates selective level measuring in the frequency range from 2 kHz to 612 kHz. Low-pass filters in the oscillator and level meter units prevent any residual f_ω voltage from causing measuring errors.

3.4 External and Internal Modulation

An amplitude modulation of the generator output voltage is possible using an external voltage at a voice frequency (VF) of 0.3 to 4 kHz or an internal voltage at 800 Hz. The amplitude modulation is accomplished in a simple transistor stage in Modulator I. The transistor is overloaded by the radio-frequency voltage of the signal oscillator at 650 kHz so that the collector current is pulse-shaped. The duration of current flow equal to the pulse duration is then changed by the VF voltage depending on the depth of modulation. The output of LPFL I provides an amplitude-modulated voltage that has a low distortion coefficient due to modulation even when the depth of modulation is high.

3.5 Power Supply

The power for the generator can be supplied from the AC power line or from the three built-in nickel-cadmium storage batteries.

Each battery has 5 gas-tight nickel-cadmium cells so that a total mean supply voltage of 18 volts is obtained. The battery capacity of 0.5 Ah permits a continuous operation of about 8 hours. The charging state of the batteries can be measured with the instrument that can be switched to this purpose.

When the battery voltage falls below 15 volts at the end of operating time, the relay Rel 801 disconnects the circuit cards from the battery.

The AC power supply essentially comprises the rectifier Gl 801, the zener diodes Gl 802, Gl 803, and the transistor T 801. It is also utilized as a battery-charging set. The transistor T 801 then supplies the constant charge current of 50 mA as determined by the voltage of the zener diode Gl 802 and the resistor R 802.

The supply voltage of 12.8 volts for the generator units is stabilized by the transistor circuit containing T 802 and T 803, both amplifying the current. The voltage of 12.8 volts is determined by the zener diodes Gl 802 and Gl 809. Both transistors are common-collector operated, that is, the load resistance is connected between emitter and common return point.

4 INSTRUCTIONS FOR OPERATION

Fig. 1 shows the positions of control knobs, connecting jacks, etc. mentioned in the sections to follow. The other components mentioned can be located with the aid of the attached illustrations.

4.1 Line Voltage and Fuses

The Signal Generator PS-3 is adjusted for a line voltage of 220 volts, 45 to 66 Hz. If operation from a 110, 115 or 240 volt line is desired, resolder the connections on the power transformer after having removed the equipment from its cabinet.

For 220 or 240 volts, the power supply is protected by a medium-acting fuse M 0.05 C.

In the case of 110 or 115 volts, replace this fuse by a medium-acting M 0.08 C.

The battery is protected by the medium-acting fuse M 0.2.

All fuses are provided below the power transformer and are marked accordingly.

4.2 Putting into Operation

It is recommended to read the battery-operation hints in Section 5 before putting the Signal Generator into operation with switch S 801.

If this switch is in position "⊣|⊢ TRANSMIT", the built-in battery is the power source and the power-plug can then be disconnected. With this switch position, the Generator is immediately ready for operation. To prevent undue discharge of the battery , it is recommended to adjust this mode switch to OFF as soon as the measuring work is completed.

The Signal Generator will operate in the floated-battery mode when the switch S 801 is in the same position "⊣|⊢ TRANSMIT" and the instrument is connected to the power line (refer to section 5.4).

In position "~ TRANSMIT " of the mode switch, the battery is disconnected and power is supplied by the power line alone. In this case, too, the generator is immediately ready for operation.

The switch S 401 AMP MOD INT should always be in position OFF if the generator is to supply a non-modulated voltage (refer to section 4.8).

4.3 Frequency Adjustment and Recalibration

Adjust the desired generator frequency with the aid of switch S 301 combined with the scale-adjusting crankwheel. The fine tuning switch should be in position "0". Using the fine tuning means, the frequency being set on the large main scale can be varied by ± 4 kHz.

The following steps are necessary for accurate adjustment of a generator frequency in the range between 0.3 to 4 kHz:

a) Operate potentiometer P 501 LEVEL so that the meter needle is about fully deflected.

b) Adjust the FINE TUNING control to exactly 0.

c) Adjust switch S 301 to the frequency range 0.3 to 150 kHz.

d) Pull the crankwheel and rotate it so that the main scale zero coincides with the scale window line and tune to zero beat as indicated by zero needle deflection.

e) Adjust the FINE TUNING control to the desired frequency.

The accuracy of the frequency adjusted is substantially determined by the adjusting and reading errors and by the temperature dependence of the L and C elements of the resonant circuit. The effect of supply voltage fluctuations, even of a fluctuating battery voltage, upon the frequency is negligible.

For further details on accuracy refer to specifications (section 2).

After extended operation and aging etc., a frequency drift, due to aging etc., may be noted; it can be corrected as follows :

To determine a frequency drift :

repeat the above steps a) to d). If the scale window line no longer coincides with the zero on the scale, recalibration is necessary.

Recalibration

After the said adjustments a) to d), turn the scale zero to coincide with the scale window line. Remove the small plate FREQ. CAL. at the bottom of the panel and adjust the trimmer capacitor C 205 to zero beat as indicated by the dip of the meter needle to zero.

4.4. Connecting a Test Object

Connect the test object to the output jack Bu 901 (output I), observing the following points:

a) Do not allow direct current to flow into the signal generator via the output jack.

b) The signal generator provides either a voltage level in dB or a power level in dBm, depending on the position of the Ri switch S 902.
Irrespective of the source impedance Ri adjusted, the voltage level of 0 dB corresponds to 0.775 volt. (Generating a power of 1 milliwatt into a resistance of 600 Ω).
The power level is dependent on the internal resistance Ri adjusted; it indicates the voltage providing a power of 1 milliwatt across the connected load impedance Z. The following applies:

Ri = Z = 75 Ω 0 dBm corresponds to 0.274 V
= 135 Ω 0 dBm corresponds to 0.367 V
= 150 Ω 0 dBm corresponds to 0.387 V

Depending on the measuring conditions, the following internal resistances can be adjusted at output I with the Ri switch S 902 (see Fig. 4):

Voltage level and balanced output
Ri = 600, 150, 135 Ω or nearly 0

Voltage level and unbalanced output
Ri = 150, 135, 75 Ω or nearly 0

Power level and balanced output
Ri = 150 or 135 Ω

Power level and unbalanced output
Ri = 150, 135, or 75 Ω

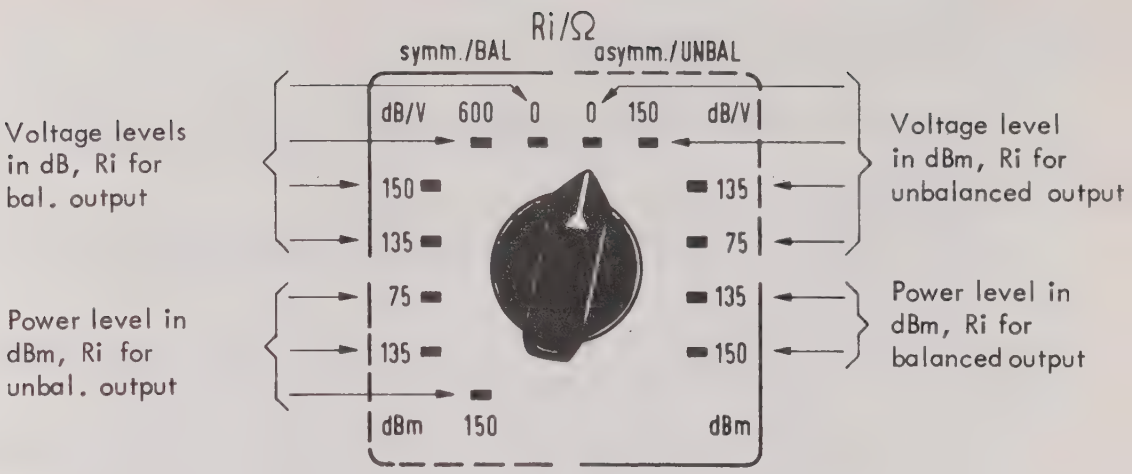


Fig. 4 Combination of Internal Resistances Ri

In the case of unbalanced generator output, the jack contact of Bu 901 is grounded. The grounded jack can be identified on the front panel by a broken line in the circuit symbol for "ground".

Output II for checking

For the exact determination or else continuous checking of the send frequency, a frequency counter can be connected to output II (Bu 902).

When sweeping the send frequency with a Sweep Unit WZ-6 (BN 408), output II should be connected with the corresponding control input of the Sweep Unit.

4.5. Adjusting the Generator Level

Adjust the desired output level at output I (Bu 901): coarsely with the level switch S 901 and fine with the potentiometer P 501.

The meter J 801 gives the readings. The output level across the jack Bu 901 is composed of the meter reading plus the value adjusted with the level switch S 901 (output level at Bu 902; see specifications, para. 2.6.). This can be illustrated by the following two examples:

Desired level: + 6 dB	
Adjustment required:	Level switch to + 10 dB and control P 501 to - 4 dB
Desired level: - 38 dBm	
Adjustment required:	Level switch to - 30 dBm and control P 501 to - 8 dBm

The output level will be equal to the level adjusted only when the following conditions are fulfilled :

a) The internal resistance of the generator must be about 0 Ω, the load impedance should be 75 Ω or greater.

b) The source impedance Ri should be equal to the load impedance Z, i.e.

Ri = Z = 75 Ω
= 135 Ω
= 150 Ω
= 600 Ω

Assuming Ri is switched from ≈ 0 to 150 Ω while the load impedance Z remains 150 Ω, the level indicated and the output level will then not change because, due to the switching, the source voltage is doubled.

The highest load occurs when the generator supplies + 11 dB while Ri = 0 and Z = 75 Ω. If you use, with this load, a frequency at the upper or lower band limit, the distortion coefficient to be expected must be highest, but generally not exceeding 1 %. If you want the distortion coefficient to be particularly small, make sure the needle deflection is as small as possible.

4.6 Generator Blanking

When you operate the pushbutton S 201, the generator voltage is disconnected or blanked. Releasing this pushbutton, the generator will supply the previously adjusted level.

Blanking of the generator level is necessary when it is not certain if the receiver is indicating the level transmitted or a noise voltage (especially when the level received by the level meter is very low).

4.7 External Control with Level Meter SPM-3.

It is recommended to read the mode of operation described in Section 3.3.

To adjust the frequency in both the generator and the level meter simultaneously, both sets should be interconnected by an "external control cable" running from the jack Bu 301 EXT. FREQ CONTROL to the corresponding jack of the level meter SPM-3.

The following steps are required before the measurements are taken :

a) Having fixed the above mentioned cable link, connect the generator output Bu 901 or Bu 902 to the input of the selective level meter SPM-3.
b) Adjust the switches on the generator and level meter front panels to the same level.
c) Adjust the desired signal frequency on the SPM-3.
d) Operate the FINE TUNING control of the generator to obtain maximum needle deflection.

After these steps, connect the object under test between the generator and the level meter.

NOTE : The generator FINE TUNING control must not be operated during the measurement.

For lengthy measurements it is recommended to readjust the FINE TUNING control to maximum needle deflection on the instrument of the level meter.

4.8 External and Internal Modulation

The generator amplitude can be amplitude-modulated with an external voltage source at frequencies between 0.3 and 4 kHz. The sinusoidal modulating voltage is then fed to the generator via jack Bu 401. The input resistance for the external source is about 10 kΩ, and 10 millivolts are required for each percent of modulation depth.
If the depth of modulation is high, the needle deflection on the generator front panel should be about 6 dB (dBm) below the full-scale value so that the maximum of the modulated generator voltage is not limited.
Apart from the external modulation, the generator level can be modulated with an internal frequency of 800 Hz and a modulation depth of about 30 %. To obtain internal modulation, set the switch S 401 INT 800 Hz m = 30 % to position ~~OFF~~ ON

See Para 4-2

5 BATTERY OPERATION AND MAINTENANCE

5.1 Battery Operation

The battery is composed of three nickel-cadmium storage batteries and has an overall capacity of 0.5 Ah. Each one of the three storage batteries has 5 cells held together with a shrunk hose. The type designation for each of the three storage batteries is DEAC 5/500 DKZ, supplied by Deutsche Edison Akkumulatoren Company (DEAC), 6000 Frankfurt, Germany. If the generator is fed only by the battery, make sure it is fully charged before you start operations at locations where no line power is available for battery re-charging. A battery can be charged overnight in about 14 hours; after that it can be continously operated in the signal generator for 8 hours.
When you replace the equipment cover, the battery is disconnected even when the mode switch S 801 is not positioned to OFF.

5.2 Battery Charging

The charging state of the battery can be checked with the front-panel meter when the mode switch S 801 is set to position CHECK. The battery has to be charged when the meter needle approaches or does not reach the left edge of the blue scale range.
The battery can be recharged with the built-in charger which supplies a constant current of 50 milliamps when the mode switch S 801 is positioned to CHARGE. The charging time amounts to approximately 14 hours. After this time, the battery voltage will have increased to about 22 volts. When you now check the charging state as described above, the meter needle will be close to the right edge of the blue range. Occasional overcharging with the full charging current of 50 milliamps for up to 24 hours will not immediately damage the battery; however, its optimum life will be reduced.

5.3 Replacement

If the battery is to be demounted (see the illustration in the appendix), slacken the four screws of the plate covering the hole in the base of the cabinet. The cover plate can then be easily removed and the three batteries can be pulled out with the aid of tabs.

5.4 Floating Battery Operation

When the generator is connected to the power line and the mode switch S 801 is in the position "⊣|⊢TRANSMIT", the battery is trickle charged with a low charging current of 16 milliamps. Occasional overloading with this current for up to 100 hours will not immediately damage the battery, but reduce its optimum life.
It is of advantage to discharge and recharge the battery from time to time. This can be accomplished by switching from line operation to battery operation, loading the battery for several hours.

5.5 Operation from Power Line

If the Generator is to be operated exclusively from the power line, it is recommended to remove the battery from the cabinet.

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
R 901	1	Schichtwiderstand	150 Ω / 0,5% / 0,25W / K1 0,5	Lv 18 / 1 / 3	
R 902	1	Schichtwiderstand	135 Ω / 0,5 % / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
R 903	1	Schichtwiderstand	150 Ω / 0,5% / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
R 904	1	Schichtwiderstand	150 Ω / 0,5% / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
R 905	1	Schichtwiderstand	67,5 Ω / 0,5% / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
R 906	1	Schichtwiderstand	75 Ω / 0,5% / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
R 907	1	Schichtwiderstand	300 Ω / 0,5% / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
R 908	1	Schichtwiderstand	300 Ω / 0,5% / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
R 909	1	Schichtwiderstand	75 Ω / 0,5 % / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
R 910	1	Schichtwiderstand	67,5 Ω / 0,5% / 0,25 W / K1 0,5	Lv 18 / 1 / 3	
C 926	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 927	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 928	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 929	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 930	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 931	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 932	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 933	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 934	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 935	1	Ker.-Kondensator	5,1 pF / ± 0,5 pF	WN 110 / 2 / 3	
C 936	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - / N 1500	10 S - Triko 06	Stettner
C 937	1	Ker.-Kondensator	5,1 pF / ± 0,5 pF	WN 110 / 2 / 3	

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
C 938	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - N 1500	10 S - Triko 06	Stettner
C 939	1	Ker.-Kondensator	18 pF / 5 %	WN 110 / 2 / 3	
C 940	1	Ker.-Scheibentrimmer	10/60 pF / 250 V - N 1500	10 S - Triko 06	Stettner
C 941	1	Ker.-Kondensator	18 pF / 5 %	WN 110 / 2 / 3	
Ü 901	1	Übertrager		Bv. 270 - 7727	
Ü 902	1	Übertrager		Bv. 270 - 7728	
Ü 903	1	Übertrager		Bv. 270 - 7736	
S 901	1	Schalter		Bv. 270 - 8002	
S 902	1	Schalter		Bv. 270 - 8015	
Bu 901	1	Buchse		WN 119 / 1 / 5	
Bu 902	1	Buchse		WN 119 / 1 / 5	

Ausgangsschaltung PS-3
Output Circuit BN 270,270/11 (9)

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
R 701	1	Schichtwiderstand	100 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 702	1	Schichtwiderstand	68 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 703	1	Schichtwiderstand	68 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 704	1	Schichtwiderstand	15 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 705	1	Schichtwiderstand	330 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 706	1	Schichtwiderstand	5,6 kΩ / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 707	1	Schichtwiderstand	5,6 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 708	1	Schichtwiderstand	2,2 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 709	1	Schichtwiderstand	6,8 kΩ / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 710	1	Schichtwiderstand	56 Ω / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 711	1	Schichtwiderstand	6,8 kΩ / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 712	1	Schichtwiderstand	4,7 kΩ / 5% / 0,25 W / Kl. 2	WN 18. / 3 / 1	
R 713	1	Schichtwiderstand	56 Ω / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 714	1	Schichtwiderstand	3,9 kΩ / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 715	1	Schichtwiderstand	270 Ω / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 716	1	Schichtwiderstand	220 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 717	1	Schichtwiderstand	100 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 718	1	Schichtwiderstand	22 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 719	1	Schichtwiderstand	22 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 720	1	Schichtwiderstand	270 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 721	1	Schichtwiderstand	18 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 722	1	Schichtwiderstand	6,8 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 723	1	Schichtwiderstand	6,8 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 724	1	Schichtwiderstand	220 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 725	1	Schichtwiderstand	33 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 726	1	Schichtwiderstand	22 Ω / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 727	1	Schichtwiderstand	22 Ω / 1% / 0,25 W / Kl. 0,5	Lv. 18 / 1 / 3	
R 728	1	Schichtwiderstand	39 Ω / 5% / 0,25 W / Kl. 2	WN 18. / 3 / 1	
R 729	1	Schichtwiderstand	15 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 730	1	Schichtwiderstand	2 Ω / 1 % / 0,33 W / Kl. 0,5	Lv 18 / 1 / 3	
R 731	1	Schichtwiderstand	2 Ω / 1 % / 0,33 W / Kl. 0,5	Lv 18 / 1 / 3	
R 732	1	Schichtwiderstand	15 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 733	1	Heißleiter	50 Ω / 10% 1W 3,5 % / 0%	Q 63011 - K 500 - K	Siemens
R 734	1	Schichtwiderstand	15 kΩ / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 735	1	Schichtwiderstand	15 Ω / 5% / 0,25 W / Kl. 2	WN 18 / 3 / 1	
R 736	1	Schichtwiderstand	1 kΩ / 5% / 0,25 W / Kl. 2	WN 18. / 3 / 1	
R 737	1	Schichtwiderstand	1,15 kΩ / 1 % / TK 50 / 0207	WN 18 / 4 / 1	
R 738	1	Metall-Schichtwid.	90,6 Ω / 1 % / TK 50 / 0207	WN 18 / 4 / 1	
P 701	1	Schichtdrehwiderst.	50 Ω / 1 W lin.	1 WN 17 / 2 / 6	
P 702	1	Schichtdrehwiderst.	10 kΩ / 1 W lin.	WN 17 / 2 / 6	

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
C 701	1	Kf. - Kondensator	1 µF / 5% / 63 V	B 32 110 - E 9 105 - M	Siemens
C 702	1	Ker. - Kondensator	8,2 pF / ± 0,5 pF / P 100	WN 110 / 2 / 3	
C 703	1	Ker. - Kondensator	47 pF / 2% / N 150	WN 110 / 2 / 3	
C 704	1	Elko	100 µF / -20 ... +75% / 30 V	ETAH 100 / 30	ERO
C 705	1	Kf. - Kondensator	0,22 µF / 10 % / 100 V	MKT 1-13 - 422 / 0 -	WIMA
C 706	1	Elko	10 µF / 20% / 25 V	WN 110 / 5 / 61	ERO
C 707	1	Elko	10 µF / 20% / 25 V	WN 110 / 5 / 61	ERO
C 708	1	Kf. - Kondensator	1 µF / 20% / 63 V	B 32 110 - F 9 105 - M	Siemens
C 709	1	Elko	10 µF / 20% / 25 V	WN 110 / 5 / 61	ERO
C 710	1	Elko	100 µF / -20 ...+75% / 30 V	ETAH 100 / 30	200 µF ERO
C 711	1	Elko	100 µF / -20 ...+75% / 30 V	ETAH 100 / 30	ERO
C 712	1	Kf. - Kondensator	10 µF / 20% / 63 V	B 32 110 - F 9 106 - M	Siemens
C 713	1	Elko	47 µF / 20% / 35 V	WN 110 / 5 / 60	
C 714	1	Elko	100 µF / -20 ...+75% / 30 V	ETAH 100 / 30	200 µF ERO
C 715	1	Elko	100 µF / -20 ...+75% / 30 V	ETAH 100 / 30	ERO
C 716	1	Elko	150 µF / 20 % / 15 V	WN 110 / 5 / 60	
T 701	1	Transistor		BCY 59 D	I T T
T 702	1	Transistor		2 N 2369 / BSX 93	SGS
T 703	1	Transistor		BCY 59 D	I T T
T 704	1	Transistor		2 N 2369 / BSX 93	SGS
T 705	1	Transistor		BCY 59 D	I T T
T 706	1	Transistor		BSY 54	I T T
T 707	1	Transistor		2 N 3251	SGS
T 708	1	Transistor		BCY 59 D	I T T
T 709	1	Transistor		BSY 54	I T T
T 710	1	Transistor		2 N 2905	SGS 4)
					Serie V u. teilw. W: 4) 2N 1711
L 701	1	Spule		Bv. 270 - 7837	

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
R 801	1	Schichtwiderstand	250 Ω / 1% / M1 0,5 / 0719	WW 18 / 1 / 3	
R 802	1	Schichtwiderstand	145 Ω / 1% / M1 0,5 / 0719	WW 18 / 1 / 3	
R 803	1	Schichtwiderstand	5,6 kΩ / 5% / 0,5 W / M1 2	WW 18 / 3 / 1	
R 804	1	Schichtwiderstand	27 Ω / 5% / 0,25 W / K1 2	WW 18 / 3 / 1	
R 805	1	Schichtwiderstand	15 kΩ / 5% / 0,25 W / K1 2	WW 18 / 3 / 1	
R 806	1	Schichtwiderstand	37 kΩ / 0,2% / M1 0,5 / 0414	WW 18 / 1 / 3	
R 807	1	Schichtwiderstand	7 kΩ / 0,5% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 808	1	Schichtwiderstand	820 Ω / 0,5% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 810	1	Schichtwiderstand	976 Ω / 0,5% / 0,25 W / M1,0,5	Lw 18 / 1 / 3	
R 811	1	Schichtwiderstand	50 kΩ / 1% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 812	1	Schichtwiderstand	35 kΩ / 1% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 813	1	Schichtwiderstand	120 Ω / 5% / 0,25 W / K1 2	WW 18 / 3 / 1	
R 814	1	Schichtwiderstand	361 Ω / 0,5% / 0,25 W / M1,0,5	Lw 18 / 1 / 3	
R 815	1	Schichtwiderstand	1,40 kΩ / 1% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 816	1	Schichtwiderstand	1,5 kΩ / 1% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 817	1	Schichtwiderstand	490 Ω / 1% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 818	1	Schichtwiderstand	20 Ω / 1% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 819	1	Schichtwiderstand	1,511 kΩ / 0,5% / 0,25 W / M1,0,5	Lw 18 / 1 / 3	
H 820	1	Heißleiter	20 Ω / 10 % TK 3,8 %/°C	Q 63011 - K 200 - K	Siemens
R 821	1	Schichtwiderstand	480 Ω / 1% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 822	1	Schichtwiderstand	930 Ω / 1% / 0,33 W / K1 0,5	Lw 18 / 1 / 3	
R 823	1	Schichtwiderstand	70 Ω / 1 % / 0,25 W / K1 0,5	Lw 18 / 1 / 3	
R 824	1	Schichtwiderstand	12 kΩ / 5 % / 0,25 W / K1 2	WW 18 / 3 / 1	
R 825	1	Schichtwiderstand	81 Ω / 0,5% / 0,25 W / M1,0,5	Lw 18 / 1 / 3	
H 826	1	Heißleiter	20 kΩ / 10 % TK 3,8 %/°C	Q 63011 - K 203 - K	Siemens
R 91	1	Schichtdrehwiderst.	100 Ω / 1 W lin.	WW 17 / 2 / 6	
C 801	1	Elko	47 µF / 450...-10% / 100 V	WW 110 / 5 / 40	
C 802	1	Elko	22 µF / 450...-10% / 16 V	WW 110 / 5 / 40	
C 803	1	Elko	4,7 µF / 20% / 10 V	WW 110 / 5 / 60	
C 804	1	Trimmer	10 / 40 pF / K 750	WW 111 / 1 / 2	
C 805	1	Ker. - Kondensator	47 pF / 2%	WW 110 / 2 / 3	
C 806	1	Elko	10 µF / 20% / 20 V	WW 110 / 5 / 60	
C 807	1	Elko	4,7 µF / 20% / 10 V	WW 110 / 5 / 60	
C 808	1	Elko	22 µF / 16 V	WW 110 / 5 / 40	
C 809	1	Elko	4,7µF / 40 V	WW 110 / 5 / 40	
C 810	1	Ker. - Kondensator	0,1 µF / 10% / 100 V -	KKT 3822 - 418 / 0	ERC
T 801	1	Transistor		ASZ 17	Valvo
T 802	1	Transistor		ASY 27	Valvo
T 803	1	Transistor		ASZ 17	Valvo
T 804	1	Transistor		ASZ 17	Valvo
T 805	1	Transistor		ASZ 17	Valvo
D 801	1	Gleichrichter	B ... C ...	44 ... 34036	SEL
D ...	1	Zenerdiode	...V ... bei I... = ...	ZPD 7,5	I T T

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
G1 803	1	Zenerdiode	U_z = 75 V ± 3% bei I_z = 5 mA	ZL 27	I T T
G1 804	1	Zenerdiode	U_z = 6,44 V ± 1% bei I_z = 5 mA	ZPD 6,8	I T T
G1 805	1	Diode		AAZ 13	Valvo
G1 806	1	Diode		AAZ 13	Valvo
G1 807	1	Diode		OA 182	Telefunken
G1 808	1	Diode		A 182	Telefunken
G1 809	1	Zenerdiode	U_z = 6,44 V ± 1% bei I_z = 5 mA	ZPD 6,8	I T T
Si 801	1	Schmelzeinsatz	220 ... 240 V: T 0,63 A 110 ... 115 V: träge DIN 41571	WW 115 / 2 / 1	
Si 802	1	Schmelzeinsatz	M 0,2 C DIN 41571	WW 115 / 2 / 1	
S 801	1	Schalter		Bv. 270 - 8001	
S 802	1	Schalter		3 WW 13 / 5 / 2	Kissling
L 81	1	Netztransformator		Bv. 270 - 7702	
Rel 961	1	Relais		Bv. 270 - 7302	
I 1	1	Instrument		Bv. 270 - 8108	
SB 801	1	Stecker - Buchse		Nr. 1 3027	Tuchel
SB 802	1	Stecker - Buchse		Nr. 1 3027	Tuchel
Stk 1	1	Kaltgerätestecker			
B 801	3	Batterie		WW 112 / 1 / 1	
B 802					

Netzteil, Anzeigeschaltung PS-3
Power Supply, Indication Circuit BN 270 (8)

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
R 301	1	Schichtwiderstand	22 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 302	1	Schichtwiderstand	18 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 303	1	Schichtwiderstand	33 Ω / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 304	1	Schichtwiderstand	2,7 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 305	1	Schichtwiderstand	27 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 306	1	Schichtwiderstand	27 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 307	1	Schichtwiderstand	220 Ω / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 308	1	Schichtwiderstand	4,7 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 310	1	Schichtwiderstand	39 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 311	1	Schichtwiderstand	15 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 312	1	Schichtwiderstand	1,2 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 313	1	Schichtwiderstand	180 Ω / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 314	1	Schichtwiderstand	820 Ω / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 315	1	Schichtwiderstand	4,7 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 316	1	Schichtwiderstand	6,8 kΩ / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 317	1	Schichtwiderstand	680 Ω / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 318	1	Schichtwiderstand	100 Ω / 5 % / 0,25 W / K1 2	WN 18 / 3 / 1	
R 319	1	Schichtwiderstand	20 Ω / 1 % / 0,33 W / K1 0,5	Lv 18 / 1 / 3	
R 320	1	Schichtwiderstand	20 Ω / 1 % / 0,33 W / K1 0,5	Lv 18 / 1 / 3	
R 321	1	Schichtwiderstand	500 Ω / 1 % / 0,33 W / K1 0,5	Lv 18 / 1 / 3	
R 322	1	Schichtwiderstand	500 Ω / 1 % / 0,33 W / K1 0,5	Lv 18 / 1 / 3	
R 323	1	Schichtwiderstand	680 Ω / 1 % / 0,33 W / K1 0,5	Lv 18 / 1 / 3	
P 301	1	Schichtdrehwiderst	5 kΩ / 1 W lin.	WN 17 / 2 / 6	
P 302	1	Schichtdrehwiderst.	100 Ω / 1 W lin.	WN 17 / 2 / 6	
C 301	1	Ker.-Kondensator	180 pF / 1 % / N 150	WN 110 / 2 / 5	Nennwert: 177 p
C 302	1	Ker.-Kondensator	47 pF / 1 % / NPO	WN 110 / 2 / 5	
C 303	1	Trimmer	3,5 / 28,5 pF	2222 804 20004	Valvo
C 304	1	Ker.-Kondensator	100 pF / 1 % / N 150	WN 110 / 2 / 5	Nennwert: 115 p
C 305	1	Ker.-Kondensator	18 pF / 5 % / P 100	WN 110 / 2 / 5	
C 306	1	Trimmer	3,5 / 28,5 pF	2222 804 20004	Valvo
C 307	1	Ker.-Kondensator	27 pF / 2 % / N 150	WN 110 / 2 / 5	Nennwert: 49 p
C 308	1	Ker.Kondensator	22 pF / 2 % / NPO	WN 110 / 2 / 5	
C 309	1	Trimmer	3,5 / 19,5 pF	2222 804 20003	Valvo
C 310	1	Ker.-Kondensator		WN 110 / 2 / 6	Abgleichwert bei Bedarf im Prüffeld eingesetzt
C 311	1	Trimmer	3,5 / 19,5 pF	2222 804 20003	Valvo
C 312	1	Ker.-Kondensator	1... pF / 1 pF / 500 V	P 100/1B/ Rd 3 x 12 L Kzk 5 / 25 V_{eff}	RIG
C 313	1	Drehkondensator	9 / 259 pF	2222 805 90 168	Valvo
C 314	1	Elko	4,7 µ / ± 20 % / 35 V	WN 110 / 5 / 60	
C 315	1	Ker.-Kondensator	160 pF/1 %/ N 150	WN 110 / 2 / 5	

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
C 316	1	Kf. - Kondensator	25 nF / 2 % / 63 V	WN 110 / 3 / 3	
C 317	1	Kf. - Kondensator	1,2 nF / 2 % /63 V	WN 110 / 3 / 3	
C 318	1	Ker.-Kondensator	100 pF / 2 %	WN 110 / 2 / 3	
C 319	1	Kf. - Kondensator	390 pF / 2 % / 63 V	WN 110 / 3 / 3	
C 320	1	Ker.-Kondensator	1 nF / +50...-20%	K 4000 / WN 110 / 2 / 4	
C 321	1	Ker.-Kondensator	3,3 nF / +50...-20%	K 4000 / WN 110 / 2 / 4	
C 322	1	Ker.-Kondensator	10 nF / +50...-20%	K 4000 / WN 110 / 2 / 4	
C 323	1	Kf.-Kondensator	0,1 µF / 10 % / 160 V	WN 110 / 3 / 5	
C 324	1	Kf.-Kondensator	0,1 µF / 10 % / 160 V	WN 110 / 3 / 5	
C 325	1	Kf.-Kondensator	10 nF / 20 % / 400 V–	WN 110 / 3 / 2	
C 326	1 x)	Kf. - Kondensator	2,2 nF / 2 % / 160 V–	WN 110 / 3 / 1	x) Nur bei Bedarf !
T 301	1	Transistor		A F 126	Valvo
T 302	1	Transistor		A F 126	Valvo
T 303	1	Transistor		A F 126	Valvo
T 304	1	Transistor		ASZ 21	Valvo
G1 301	1	Diode	zu Quartett ausgesucht	A A Z - 10 C	Telefunken
G1 302	1	Diode		A A Z - 10 C	Telefunken
G1 303	1	Diode		A A Z - 10 C	Telefunken
G1 304	1	Diode		A A Z - 10 C	Telefunken
L 301	1	Spule		Bv. 270 - 7846	
Ü 301	1	Übertrager		Bv. 270 - 7733	
Ü 302	1	Übertrager		Bv. 270 - 7737	
Ü 303	1	Übertrager		Bv. 270 - 7735	
S 301	1	Schalter		Bv. 270 - 8014	
S 302				kombiniert mit Bu 301	
S 303				je 1 x u	
Bu 301	1	[illegible]		2 [illegible] 119 , 1 / 8	

Trägeroszillator, Modulator II PS-3
Carrier Oscillator, Modulator II BN 270 (3)

Teil	Stück-zahl	Benennung	elektrische Werte	Sach-Nr	Bemerkungen Hersteller
R 401	1	Schichtwiderstand	4,7 kΩ / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 402	1	Schichtwiderstand	15 kΩ / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 403	1	Schichtwiderstand	12 kΩ / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 404	1	Schichtwiderstand	3,9 kΩ / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 405	1	Schichtwiderstand	3,9 kΩ / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 406	1	Schichtwiderstand	150 Ω / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 407	1	Schichtwiderstand	2,7 kΩ / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 408	1	Schichtwiderstand	47 Ω / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 409	1	Schichtwiderstand	820 Ω / 5 % / 0,25 W / KL 2	W N 18 / 3 / 1	
R 410	1	Schichtwiderstand	75 Ω / 1 % / 0,33 W / KL 0,5	Lv. 18 / 1 / 3	
P 411	1	Heißleiter	500 kΩ / 10 % TK 5,3 % / °C	Q 63011 - K 504 - K	Siemens
C 401	1	Kf. - Kondensator	4,68 µF / ± 10 % / 10 V	WK 110 / 3 / 6	
C 402	1	Ker. - Kondensator	1 nF / ± 20 % / 400 V	K 2000 / RDGU 3 x 12	Valvo
C 403	1	Elko	22 µF / +50...-10% / 16 V	W N 110 / 5 / 40	
C 404	1	Elko	150 µF / ± 20 % / 6 V	WN 110 / 5 / 60	
C 405	1	Kf - Kondensator	2,12 nF / ± 2 % / 63 V	WK 110 / 3 / 3	
C 406	1	Ker. Kondensator	207 pF / ± 2 % / 500 V	N 150 1A / Rd 3x30 L	RIG
C 407	1	Kf - Kondensator	3,76 nF / ± 2 % / 63 V	WK 110 / 3 / 3	
C 408	1	Kf - Kondensator	920 pF / ± 2 % / 63 V	WK 110 / 3 / 3	
C 409	1	Kf - Kondensator	3,49 nF / ± 2 % / 63 V	WK 110 / 3 / 3	
C 410	1	Kf - Kondensator	730 pF / ± 2 % / 63 V	WK 110 / 3 / 3	

Teil	Stück-zahl	Benennung	elektrische Werte	Sach-Nr	Bemerkungen Hersteller
C 411	1	Kf - Kondensator	1,7 nF / ± 2 % / 63 V	WK 110/3/3	
T 401	1	Transistor		A F 126	Valvo
T 402	1	Transistor		A F 126	Valvo
Ü 401	1	Übertrager		Bv. 270 - 7776	
L 401	1	Spule		Bv. 270 - 7839	
L 402	1	Spule		Bv. 270 - 7840	
L 403	1	Spule		Bv. 270 - 7841	
Bu 401	1	Buchse		WK 119 / 1 / 5	
S 401	1	Schalter		B 1 WK 13 / 4 / 1	Lötfahnen 5) hochgebogen
				Serie I: 5) Schalter m. Durchgangsloch	

Modulator I, Tiefpaß I — PS-3
Modulator I, Low-Pass Filter I BN 270 (4)

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
R 501	1	Schichtwiderstand	26,8 Ω / 1 % / 0,33 W / KL 0,5	Lv 18 / 1 / 3	
R 502	1	Schichtwiderstand	38,31 kΩ / 1 % / 0,33 W / KL 0,5	Lv 18 / 1 / 3	
R 503	1	Schichtwiderstand	8,2 kΩ / 5 % / 0,25 W / KL 2	WN 18 / 3 / 1	
R 504	1	Schichtwiderstand	27 kΩ / 5 % / 0,25 W / KL 2	WN 18 / 3 / 1	
R 505	1	Schichtwiderstand	27 kΩ / 5 % / 0,25 W / KL 2	WN 18 / 3 / 1	
R 506	1	Schichtwiderstand	680 Ω / 5 % / 0,25 W / KL 2	WN 18 / 3 / 1	
R 507	1	Schichtwiderstand	3,3 kΩ / 5 % / 0,25 W / KL 2	WN 18 / 3 / 1	
R 508	1	Schichtwiderstand	1 kΩ / 5 % / 0,25 W / KL 2	WN 18 / 3 / 1	
R 510	1	Schichtwiderstand	511 Ω / 1 % / 0,25 W / KL 0,5	Lv. 18 / 1 / 3	
R 511	1	Schichtwiderstand	2k Ω / 0,5% / 0,25 W / KL 0,5	Lv. 18 / 1 / 3	
R 512	1	Schichtwiderstand	121 Ω / 0,5% / 0,25 W / KL 0,5	Lv. 18 / 1 / 3	
R 513	1	Schichtwiderstand	354 Ω / 0,5% / 0,25 W / KL 0,5	Lv. 18 / 1 / 3	
P 501	1	Schichtdrehwiderst.	2,5 kΩ / lin 0,2 W	4 WN 17 / 2 / 5	
C 501	1	Ker.-Kondensator	201 pF / 1 % / 500 V -	N 150 / 1A / Rd 3 x 30 L	RIG
C 502	1	Ker.-Kondensator	14 nF / 2 % / 50 V -	N 15K / 1B / RDLU 3 x 10	CRL
C 503	1	Kf.-Kondensator	270 pF / 1 % / 63 V	WK 110 / 3 / 3	
C 504	1	Kf.-Kondensator	311 pF / 1 % / 63 V	WK 110 / 3 / 3	507 pF
C 505	1	Ker.-Kondensator	150 pF / 1 % / 400 V -	NPO / 1A / Rd 3 x 30 L	RIG
C 506	1	Ker.-Kondensator	47 pF / 1 % / 500 V -	NPO / 1A / Rd 3 x 14 L	RIG
C 507	1	Ker.-Kondensator	396 pF / 1 % / 500 V	N 150 / 1A / Rd 3 x 30 L	RIG
C 508	1	Kf.-Kondensator	362 pF / 1 % / 63 V	WK 110 / 3 / 3	
C 509	1	Kf.-Kondensator	257 pF / 1 % / 63 V	WK 110 / 3 / 3	

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
C 510	1	Ker.-Kondensator	43 pF / 1 % / 500 V -	N 150 / 1A / Rd 3 x 12 L	RIG
C 511	1	Ker.-Kondensator	177 pF / 1 % / 500 V -	N 150 / 1A / 3 x 30 L	RIG
C 512	1	Kf.-Kondensator	3,207 nF / 1 % / 63 V	WK 110 / 3 / 3	
C 513	1	Ker. - Kondensator	56 pF / 1 % / 500 V	N 150 / 1A / Rd 3 x 14 L	RIG
C 514	1	MF.-Kondensator	1 µF / 20 % / 63 V	F 37130 - E 9105 - M	Siemens
C 515	1	Elko	22 µF / +50... -10 % / 16 V	WK 110 / 5 / 40	
C 516	1	Elko	10 µF / +50... -10 % / 25 V	WK 110 / 5 / 40	
C 517	1	Tantal - Elko	4,7 µF / 20 % / 10 V	WN 110 / 5 / 60	
T 501	1	Transistor		A F 126	Valvo
L 501	1	Spule		Bv. 270 - 7842	
L 502	1	Spule		Bv. 270 - 7844	
L 503	1	Spule		Bv. 270 - 7845	
L 504	1	Spule		Bv. 270 - 7843	
L 505	1	Spule		Bv. 270 - 7834	
L 506	1	Spule		Bv. 270 - 7835	

Tiefpaß II und Vorstufe für Endverstärker — PS-3
Low-Pass Filter II and Pre-amplifier for Final Amplifier BN 270 (5)

Schaltbuchse	chassis connector with switching contact
Schalter	switch
Schichtdrehwiderstand	carbon layer potentiometer
Schichtwiderstand	film resistor
Serienänderung	series change
Signalleuchte	signal lamp (pilot light)
Spannungswähler	voltage selector switch
Spindelwiderstand	variable slider resistor
Spule	coil
Stecker	plug
Stück	pieces
Teil	part (component)
teilweise	partially
Transistor	transistor
Trimmer	trimmer
Übertrager	matching transformer
ungewendelt	unwound
Widerstandselement	resistance element
wird vom Prüffeld eingesetzt	adjusted and set at factory

Teil	Stück-zahl	Benennung	elektrische Werte	Sach-Nr	Bemerkungen Hersteller
R 101	1	Schichtwiderstand	18 KΩ / ± 1% / 0,25 W / KI 2	WN 18 / 1 / 3	
R 102	1	Schichtwiderstand	6,8 KΩ / ± 1% / 0,25 W / KI 2	WN 18 / 1 / 3	
R 103	1	Schichtwiderstand	2,7 KΩ / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 104	1	Schichtwiderstand	2,2 KΩ / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 105	1	Schichtwiderstand	47 kΩ / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 106	1	Schichtwiderstand	1 KΩ / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 107	1	Schichtwiderstand	10 KΩ / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 108	1	Schichtwiderstand	10 KΩ / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 109	1	Schichtwiderstand	10 KΩ / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 110	1	Schichtwiderstand	10 KΩ / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 111	1	Schichtwiderstand	6,8 Ω / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
R 112	1	Schichtwiderstand	82 Ω / 5 % / 0,25 W / KI 2	WN 18 / 3 / 1	
P 101	1	Schichtdrehwiderst.	5 kΩ lin 1 W	WN 17 / 2 / 6	
C 101	1	Elko	100 µF / +50 -10 % / 25 V	WN 110 / 5 / 40	
C 102	1	Tantal - Kondens.	100 µF / ± 20 % / 16 V	WN 110 / 5 / 60	

Teil	Stück-zahl	Benennung	elektrische Werte	Sach-Nr	Bemerkungen Hersteller
C 103	1	Kf. - Kondensator	23,9 nF / 2 % / 63 V	WN 110 / 3 / 3	
C 104	1	Kf. - Kondensator	23,9 nF / 2 % / 63 V	WN 110 / 3 / 3	
C 105	1	Kf. - Kondensator	23,9 nF / 2 % / 63 V	WN 110 / 3 / 3	
C 106	1	Kf. - Kondensator	23,9 nF / 2 % / 63 V	WN 110 / 3 / 3	
C 107	1	Elko	10 µF / +50...-10 % / 25 V	WN 110 / 5 / 40	
C 108	1	Elko	22 µF / +50...-10 % / 16 V	WN 110 / 5 / 40	
T 101	1	Transistor		AF 126	Valvo
T 102	1	Transistor		AF 126	Valvo
T 103	1	Transistor		ASY 27	Valvo

800-Hz-Oszillator PS-3
800 Hz Oscillator BN 270 (1)

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
Z 1	1	Heißleiter	500 kΩ / 10 % TK 5,7 % / °C	Q 63011 - K - 504 - K	Siemens
R 201	1	Schichtwiderstand	22 kΩ / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
R 3	1	Schichtwiderstand	18 kΩ / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
R 4	1	Schichtwiderstand	33 Ω / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
R 205	1	Schichtwiderstand	2,7 kΩ / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
R 206	1	Schichtwiderstand	39 kΩ / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
R 207	1	Schichtwiderstand	15 kΩ / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
R 208	1	Schichtwiderstand	33 Ω / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
R 209	1	Schichtwiderstand	3,3 kΩ / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
R 210	1	Schichtwiderstand	120 Ω / 5% / 0,25 W / KI 2	WN 18 / 3 / 1	
C 201	1	Ker.-Kondensator	150 pF / 1% / NPO	WN 110 / 2 / 5	} +97 pF
C 202	1	Ker.-Kondensator	150 pF / 1% / NPO	WN 110 / 2 / 5	
C 203	1	Ker.-Kondensator	150 pF / 1% / NPO	WN 110 / 2 / 5	
C 204	1	Ker.-Kondensator	47 pF / 1% / NPO	WN 110 / 2 / 5	
C 205	1	Trimmer	10 / 40 pF N 750	10 S - Triko 20 mit WS 60 Japragnierung	Stettner
C 206	1	Ker.-Kondensator	150 pF / 1% / N 150	WN 110 / 2 / 5	
C 207	1	Drehkondensator	4 / 44 pF	2222 034 15 024	Drehkonst Valvo 200 cap
C 208	1	Kf-Kondensator	25 nF / 2% / 63 V	WN 110 / 3 / 3	
C 209	1	Kf-Kondensator	1,2 nF / 2% / 63 V	WN 110 / 3 / 3	
C 210	1	Trimmer	10 / 40 pF N 750	WN 111 / 1 / 2	
C 211	1	Ker.-Kondensator	82 pF / 2% / 500 V	N 150 / 1A / Rd 3 x 16 L	Fil

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller, Anmerkgn
C 212	1	Kf-Kondensator	390 nF / 2% / 63 V	WN 110 / 3 / 3	
C 213	1	Elko	22 µF / +50...-10 % / 16 V	WN 110 / 5 / 40	
C 214	1	Ker.-Kondensator	3,3 nF / 20 % / 400 V ~	K 2000 ROGU 3 x 16	Valvo
T 201	1	Transistor		AF 126	Valvo
T 202	1	Transistor		AF 126	Valvo
L 201	1	Spule		Bv. 270 - 7838	
S 201	1	Taste		1012 - A - sw - F2 - R	ase

650-kHz-Signaloszillator PS-3
650 kHz Signal Oscillator BN 270 (2)

SCHEME

Alignment procedure

= 0 N), Ri = 0. Level Meter or VTVM with flat frequency response between 20 and 600 kHz connected

z and produce clear needle deflection on VTVM with P 501. Likewise, deflection on J 801 with P 801 .

Hz and same deflection on VTVM with P 501, then same reading on J 801 with C 804. Repeat procedure

. Feed f = 20 kHz to Bu 901 CAL level meter (R_{in} = 150 Ω). Adjust exactly 0 dB (0 N) on the calibration
e P 801 to bring generator level reading to the scale mark 0 dB (0 N).

urs at room temperature. Avoid vibration and draft during alignment.

901. Feed standard 1 MHz to Bu 301 INPUT EXT (Ri = max. 1 kΩ, E = 0.1 to 1V). Adjust FINE TUNING
iat exactly 350 kHz ± 1 Hz appear across the generator output. Now the signal oscillator provides exactly

or and its accuracy is the basis of the now following recalibration of the carrier oscillator. Make sure the
tered, check it from time to time.

kHz in range I. Align generator output frequency to 150 kHz with C 303.

kHz in range II. Align generator output frequency to 300 kHz with C 306.

kHz in range III. Align generator output frequency to 450 kHz with C 309.

kHz . Align generator output frequency to 600 kHz with C 311.

1. Coarse scale to exactly 10 kHz, FINE TUNING scale to zero.

10 kHz ± 1 Hz with C 205.If no frequency meter is available, adjust generator frequency on coarse scale to
) Hz. Fully turn on the generator level with P 501 and adjust to minimum needle deflection of front-panel

901. R_{in} = min. 10 kΩ. Generator adjustment : f = 20.0 kHz, 0 dB (0 N), Ri = 0. Turn down the front-
N) with the aid of P 501. Adjust switch S 401 to INT. Adjust P 101 so that the level difference between
Hz is exactly 16.5 dB (1.90 N).

Anmerkungen zu den Schaltteillisten (Notes for Parts Lists)

Belastbarkeit und Größenbezeichnung der Widerstände nach DIN 44050 ff.

Loading capability and value designation of resistors corresponding to German Standard DIN 44050 ff.

Übersetzungstabelle (List of translated terms)

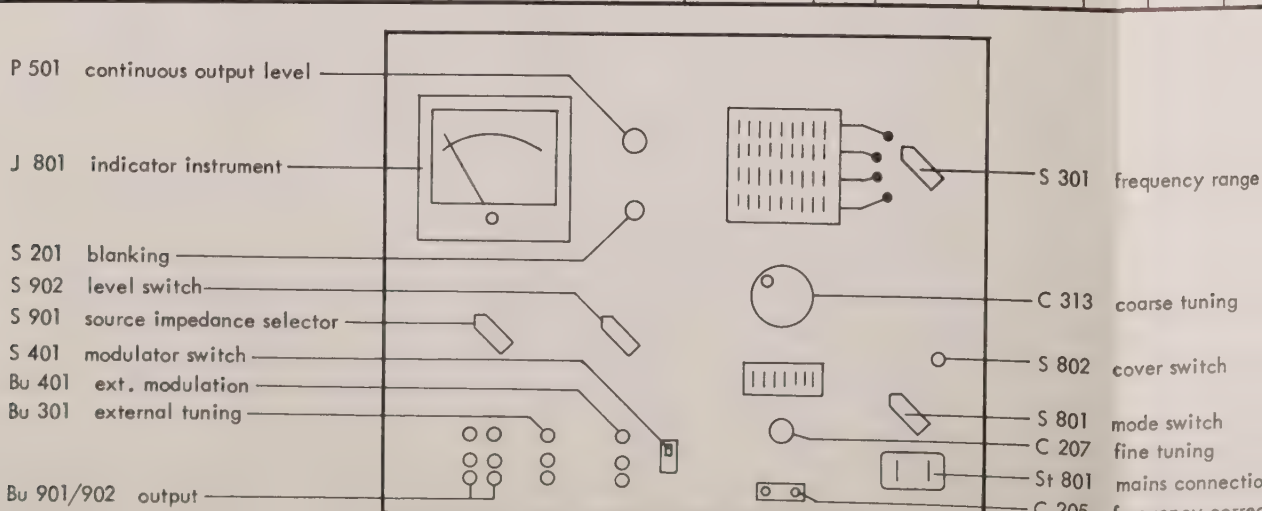
Abgleichwert	alignment value
Ansprecherregung	threshold energy
ausgesucht auf	selected and matched for
Benennung	designation
Bestellangaben	ordering information
Bezeichnung	nomenclature
Buchse	connector (plug)
Diode	diode
Drahtwiderstand	wire-wound resistor
Drucktaste	push button
elektrische Werte	electrical value
Elko	electrolytic capacitor
entfällt	deleted
Flanschdose	flanged chassis connector
Gerätestecker	power line chassis plug
Gleichrichter	rectifier
G.-Schmelzeinsatz	fuse
Hersteller, Anmerkungen	manufacturer, notes
Instrument	meter
Integr. Schaltkreis	integrated circuit
Kaltleiter	PTC resistor
Ker.-Kondensator	ceramic capacitor
Ker.-Trimmpot.	cermet trimmer potentiometer
Kf.-Kondensator	plastic foil capacitor
Kontaktmaterial	contact material
Kontaktstifte	contact pins
Lampe	indicator lamp
Lötfahnen hochgebogen	soldering tab (bent up)
Metall-Schichtwiderstand	metallic film resistor
mit Längsschliff	with slide adjustment
Netztrafo	power transformer (mains transformer)
ohne Kappe	without cover (without cap)
Pegelschalter	level switch
Reed-Kontakt	reed relay contact
Relais	relay

generator		Measuring procedure	Unit to be checked:
902	P501		
= 0	——	The measuring values stated should be adjustable with P 501	Output Amplifier
= 0	——	Adjust the measurement stated with P 501. The reading on the front-panel meter should be 0 dB (0 Np).	Meter circuit
ional	——	Adjust the measurement with P 501. The front-panel meter reading is permitted to change by max. 1.5% for all positions of S 902.	Only BN 270 and BN 270/3 Meter divider
= 0	——	The measuring values stated should be adjustable with P 501	Output circuit
0	——	Operate P 501 until front-panel meter reading is 0 dB.	Level reading
—	——		800-Hz oscillator
—	——		
0	——	Operate P 501 to reduce the reading to -4 dB (-0.5 Np). Modulation disappears when S 401 is adjusted to position EXTERNAL.	Internal amplitude modulation
0	——	Operate P 501 to reduce reading to - 4 dB (-0.5 Np).	External amplitude modulation

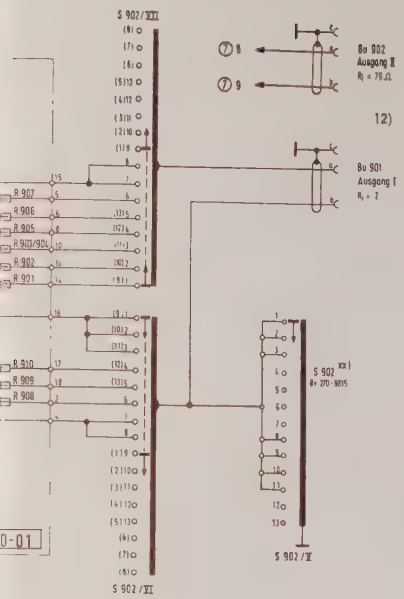
No.	Component aligned	Alignment problem	
1)	C 804	Accuracy of output level 0 dB (ON), Ri=0, R_L = 150 Ω	Generator adjusted to 0 dB (0 nepe to Bu 901. (R_{in} = 150 Ω). Adjust generator frequency to 20 k Adjust generator frequency to 600 until no improvement noticeable.
	P 801		Generator adjustment same as abov level meter with P 501, then opera
2)		Frequency Carrier oscillator	Allow for a warming-up time of 3 h 1) Connect frequency counter to Bu control of the object under test so 650 kHz. This adjustment of the signal oscill signal oscillator adjustment is not
	C 303	Range I	Position coarse scale to exactly 15
	C 306	Range II	Position coarse scale to exactly 30
	C 309	Range III	Position coarse scale to exactly 45
	C 311	Range IV	Position coarse scale to exactly 60
3)	C 205 FREQ CAL	Frequency Signal Oscillator	Connect frequency counter to Bu 9 Align generator output frequency t 0 Hz, FINE TUNING scale also to meter J 801 with C 205
4)	P 101	Depth of modulation for internal modulation	Connect selective level meter to panel meter reading to -4 dB (-0.5 20.0 kHz and both 20.8 and 19.2

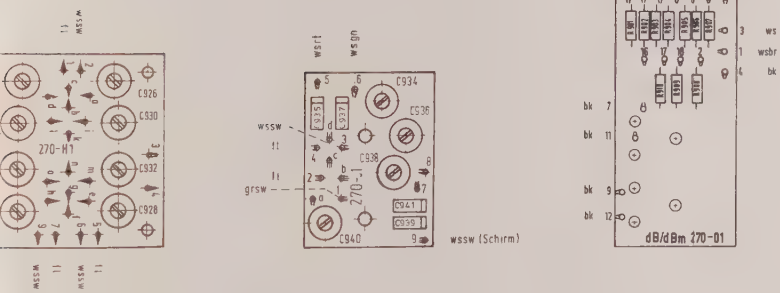
generator S 902	generator P 501	Measuring procedure	Unit to be checked :
——	——	Disconnect from power-line: Measurement must not change.	Power supply and battery charger
——	——	Reconnect to power-line: Battery voltage is indicated (charging voltage). Depress S 802. Voltage rises to 25 ±1 volts. Disconnect from power-line; voltage drops to battery discharge voltage.	
——	——	Charging current	
——	——	Remove cover from LPFL II. Depress S 201. Reading goes back to zero. If this value is maintained, the other testing procedures under para 2 can be omitted.	All units up to modulator II starting from output
——	——	Open hood of carrier oscillator. Insert decoupling capacitor of 20 nF into input circuit of Level Meter to block the dc voltage of 5 volts. Depress S 201 or insert plug into Bu 301: The measurement should now be reduced to 0.	Carrier oscillator
——	——	Operate S 203 and S 303 by inserting a plug into Bu 301.	External control
——	——	Depress S 201. Reading returns to 0. When reading correct, omit the procedure 2.2.2 .	All units up to LPFL I starting from output
——	——	Open covers of signal oscillator, modulator I and LPFL I. Reading should drop to zero	Signal oscillator
Ri = 0 Ri=600	——		LPFL II and pre-stage
Ri=0 Ri=600Ω		When the power level is adjusted on equipment BN 270, the reading on equipment BN 270/3 is reduced in comparison with position Ri = 0 and Ri = 600 Ω. in pos. Ri = 150 Ω by 6.02 ± 0.1 dB (0.69 ± 0.01 Np) in pos. Ri = 135 Ω by 6.48 ± 0.1 dB (0.75 ± 0.01 Np) in pos. Ri = 75 Ω by 9.04 ± 0.1 dB (1.04 ± 0.01 Np)	Only BN 270 and BN 270/3 Power level attenuator

No.	+ feed to • measure at TP	Ri of generator R_{in} of measuring set used	Expected value or rating	Frequency	fine	coarse	Adjustments on the S 401	S 801	S 901	S
4	•(7) across 3 and 5 (ground)	(compare 3.2)	≧ + 15.6 dB (+ 1.8 Np) ≧ + 14.9 dB (+ 1.7 Np)	20kHz 612kHz	0 0	20kHz 612kHz	external external	5	——	Ri =
5.1	——dto——	—— dto ——	+ 13.7 dB (+ 1.58 Np)	20 kHz	0	20 kHz	external	5	——	Ri =
5.2	• J 801	——	0 dB (0 Np)	20 kHz	0	20 kHz	external	5	——	opt
6.1	• J 801	Selective level meter R_{in} = 150 Ω	≧ + 11.2 dB (+ 1.12 Np)	612kHz	0	612kHz	external	5	+10dB (+1Np)	Ri =
6.2	—— dto ——	—— dto ——	0dB ±0.15dB (0 Np±0.015 Np)	20 kHz	0	20 kHz	external	5	0 dB (0 Np)	Ri =
7	•(1) across 2 and 3 (ground) •(1) across 2 and 3 (ground)	Frequencycounter R_{in} ≧ 10 kΩ Selective or wide-band level meter R_{in} ≧ 10 kΩ	800 Hz ±80Hz - 13 ± 1 dB (- 1.5 ±0.12 Np)	—— 800 Hz	—— ——	—— ——	internal internal	5 5	—— ——	— —
8.1	Bu 901	Selective level meter R_{in} ≧ 10kΩ or oscilloscope	Sideband suppression 16.5±0.5 dB (1.9±0.06 Np) Visual inspection Oscilloscope display	20 kHz and sideband	0	20 kHz	internal	5	0 dB (0 Np)	Ri =
8.2	+ Bu 401 • Bu 901	AF generator Ri = max. 50 Ω otherwise see para No. 8.1	≈10 mV / % (as in Serial No.) 8.1	0.3 to 4 kHz	0	20 kHz	external	5	0 dB (0 Np)	Ri =

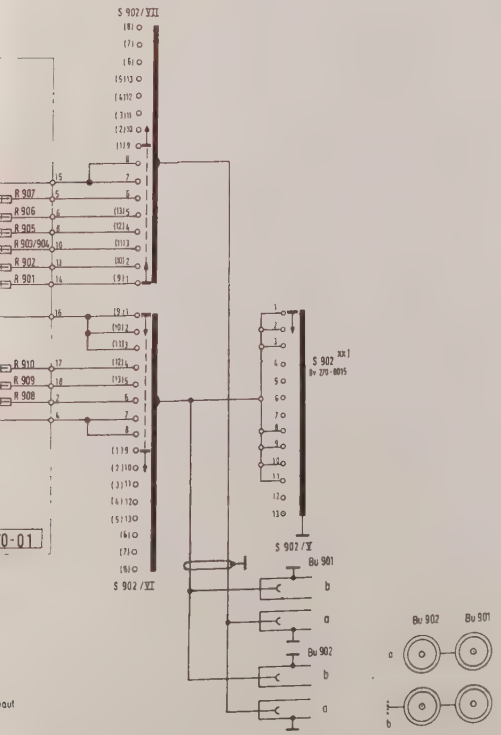

P 501 continuous output level
J 801 indicator instrument
S 201 blanking
S 902 level switch
S 901 source impedance selector
S 401 modulator switch
Bu 401 ext. modulation
Bu 301 external tuning
Bu 901/902 output
S 301 frequency range
C 313 coarse tuning
S 802 cover switch
S 801 mode switch
C 207 fine tuning
St 801 mains connectio
C 205 frequency correc

10) balanced
11) unbalanced
12).... Output... Z_{out}...
13) ---x) All bridgings are fitted in test section
14) ..) S 902/III see circuit diagram (8)
S 902/I see circuit diagram (5)



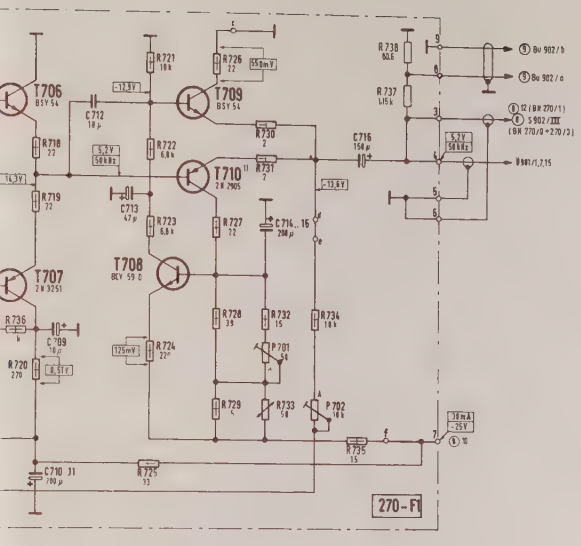


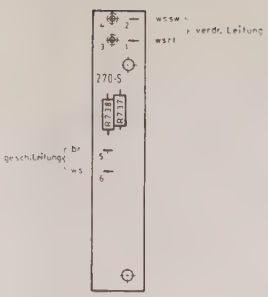
Ausgangsschaltung PS-3
Output Circuit BN 270 (9)

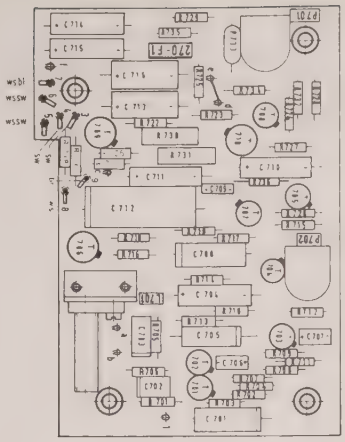


Ausgangsschaltung PS-3
Output Circuit BN 270/11 (9)

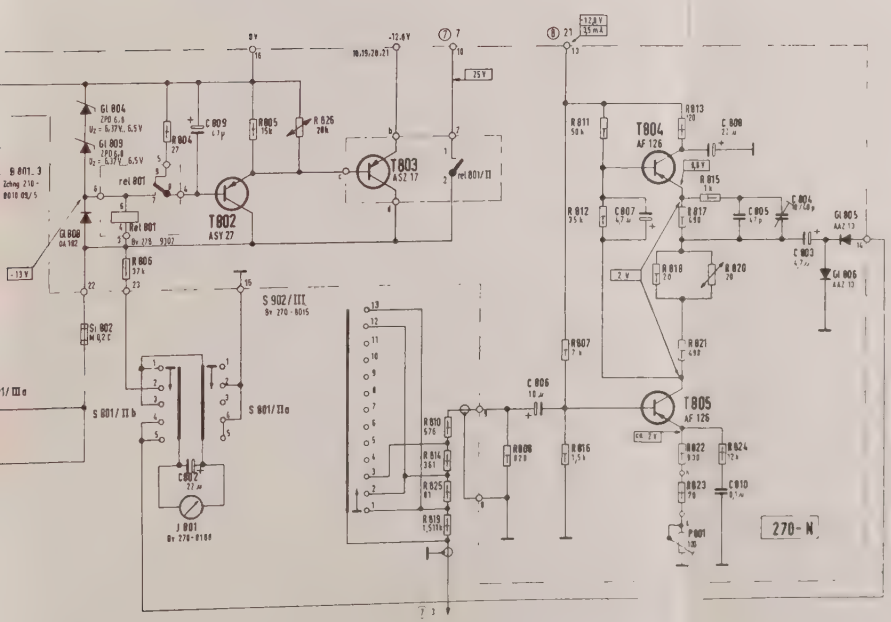
No.	+ feed to • measure at TP	Ri of generator R_{in} of measuring set used	Expected value or rating	Frequency			Adjustments on the		
				Frequency	fine	coarse	S 401	S 801	S 90
1.1	• ⑧ across 18(-) and ground (+)	100 kΩ / V	-12.5 V ± 0.5 V -12.5 V ± 0.5 V	——	——	——	external external	4 5	——
1.2	• ⑧ across 10(-) and ground (+)	100 kΩ / V	-18 V to -22.5 V	——	——	——	external	4	——
1.3	• ⑧ SB 801 (pin: + pole) ≈ 1 Ω		50 mA ± 3mA 79 mA ± 4 mA	——	——	——	external external	3 4	——
2	• ⑤ across 1 and ground	Selective level meter R_{in} = max. 10 kΩ	≧ - 18.2 dB (- 2.1 Np)	20 kHz	0	20 kHz	external	5	——
2.1.1	• ③ across 9 and ground	Selective or wide-band level meter R_{in} = max. 10 kΩ	-12 to 4 dB (-1.38 to -46 Np)	670 kHz	0	20 kHz	external	5	——
2.1.2	+ Bu 301 • ③ across 9 and ground	Ri ~ 0 Selective or wideband level meter R_{in} = max. 10 kΩ	- 7 dB (- 0.8 Np) - 7 dB (- 0.8 Np)	670 kHz 670 kHz	—— ——	—— ——	—— ——	5 5	—— ——
2.2.1	• ③ across 5 and 4 (ground)	Selective or wide-band level meter R_{in} = max. 10 kΩ	≧ 2.5 dB (- 0.29 Np)	650 kHz	0	——	external	5	——
2.2.2	• ② across a/b and e (ground)	—— dto ——	≧ - 6.9 dB (-0.79 Np)	650 kHz	0	——	external	5	——
3.1	• ⑤ across 4 and ground	—— dto ——	≧ - 18.8 dB (- 2.1 Np)	20 kHz	0	20 kHz	external	5	——
3.2	• ⑤ across 4 and ground	Selective or wide-band level meter R_{in} = max. 10 kΩ	≧ - 18.8 dB (- 2.1 Np)	20 kHz	0	20 kHz	external	5	

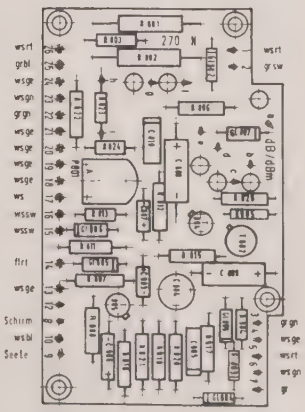






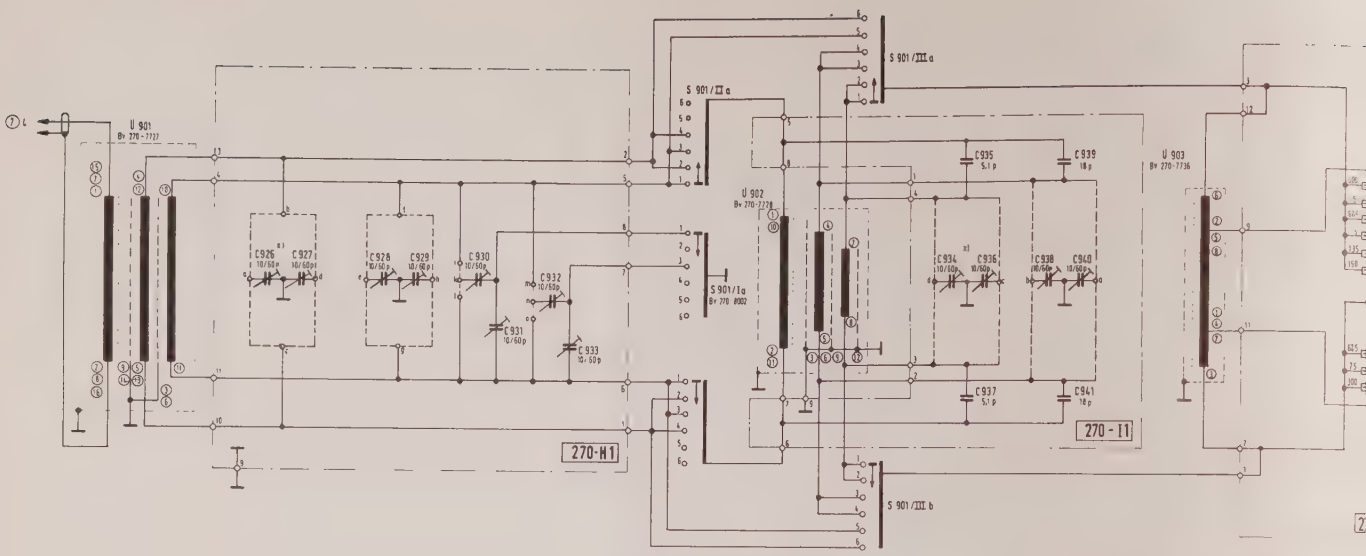
Endverstärker PS-3
Final Amplifier BN 270 (7)



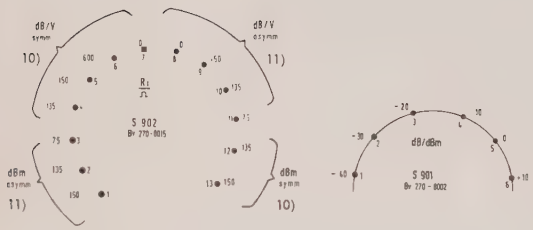


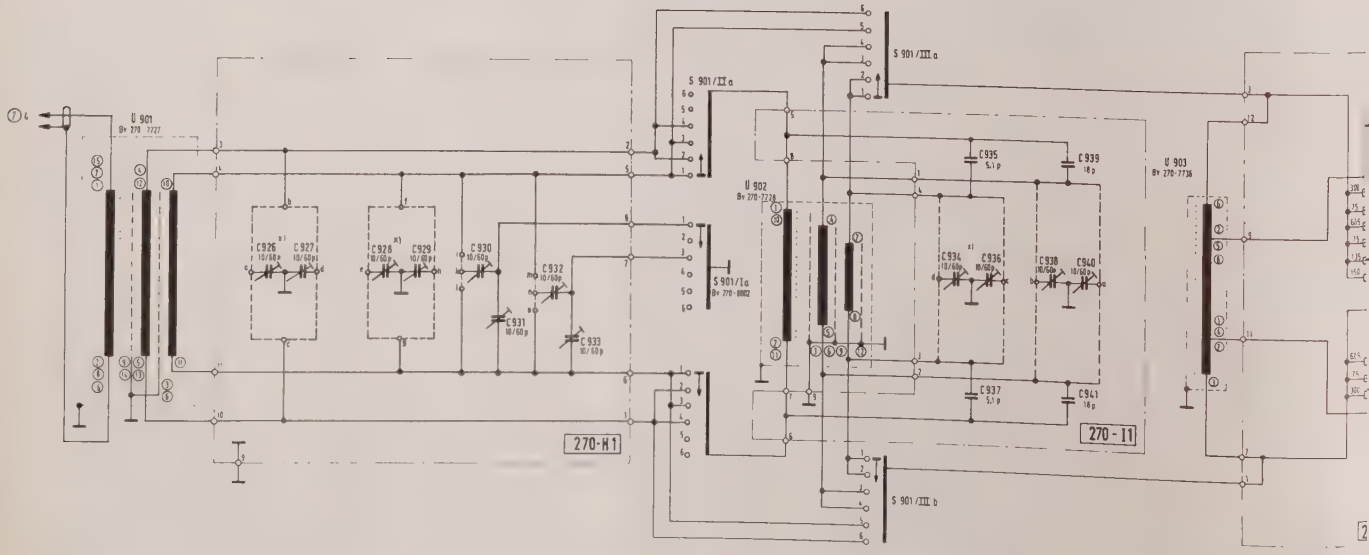
10) balanced
11) unbalanced
12) "off"
13) check
14) change
15) transmit
16) x)...S 802 is closed when cabinet cover is open

Netzteil, Anzeigeschaltung PS-3
Power Supply, Indication Circuit BN 270 (8)

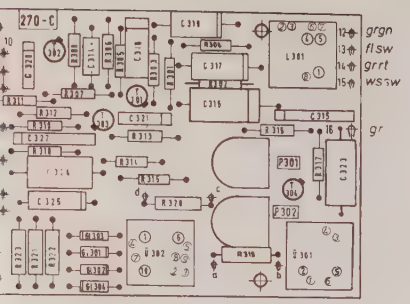


13) (---x) Sämtliche Brucken werden im Pruffeld eingebaut
14) xx) Schaltebene III siehe Stromlaufplan (8)
Schaltebene I siehe Stromlaufplan (5)





13) (---x) Sämtliche Brucken werden im Pruffeld eing
14) xx) Schaltebene III siehe Stromlaufplan (8)
Schaltebene I siehe Stromlaufplan (5)



13) x) Bei Bedarf: C 326 (siehe Schaltteilliste ③)

14) Alle Gleichspannungen gegen Masse mit Instrument 100 kΩ/V gemessen

15) L 301 ist dabei kurzgeschlossen

10) Alignment value
11) Extern. frequency control
12) Front panel ground
13) x) When necessary: C 326 (see list part ③)
14) All DC voltages are measured to chassis-ground with 100 kΩ/V meter
15) L 301 is thereupon short-circuited

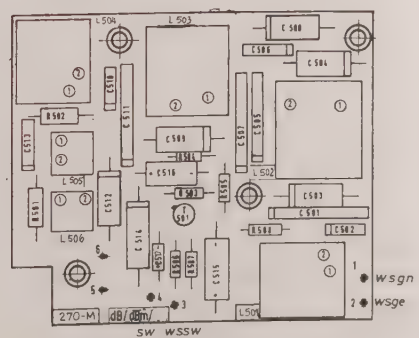
Trägeroszillator, Modulator II PS-3
Carrier Oscillator, Modulator II BN 270 ③

Sedr Schaltung 270-B1 teilweise auf Stromlaufplan ②

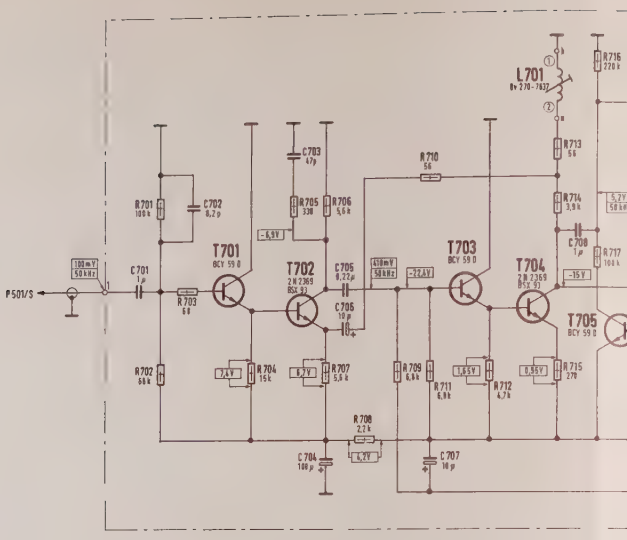
External modulation
External/internal modulation
internal
external
108 mV AF for m = 30 %
Printed circuit 270-B1 see circuit diagram ②

Modulator I, Tiefpaß I PS-3
Modulator I, Low-Pass Filter I BN 270 ④

/V
symmetrisch
11)
dBm 10)
symmetrisch



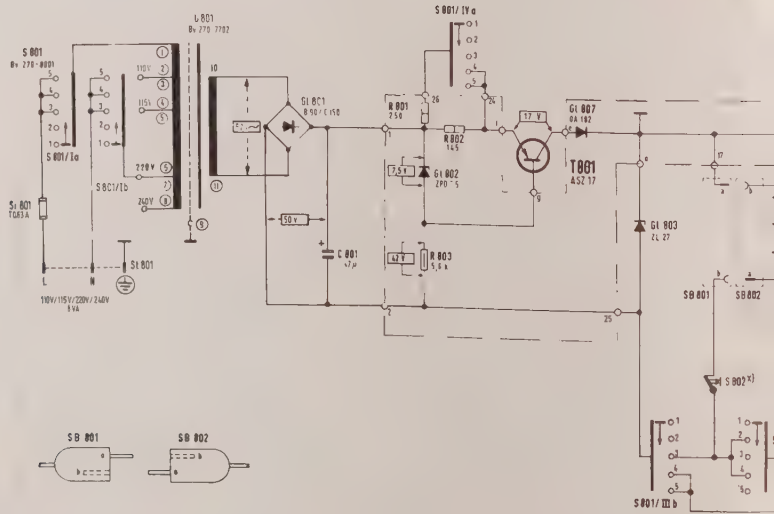
Tiefpaß II und Vorstufe für Endverstärker PS-3
Low-Pass Filter II and Pre-amplifier for Final Amplifier BN 270 ⑤

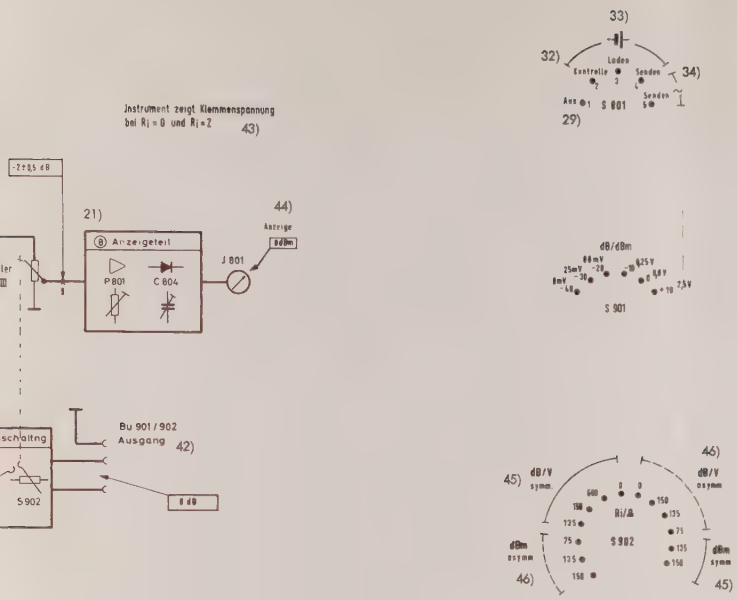


Anmerkungen:

1) Serie T...V u. teilw. W T 710/2N 1131

Notes: 1) Series T to V and partically W





10) Oscillator...
11) Signal oscillator
12) Modulator II
13) Buffer stage
14) Carrier oscillator
15) Buffer stage
16) Modulator I
17) Low-pass filter I
18) Low-pass filter II
19) Preamplifier
20) Final amplifier
21) Meter unit
22) Power supply and charging unit
23) Output circuit
24) ...External modulation...to...Z_{in}...
25) external
26) internal
27) fine tuning
28) "Frequency calibration"
29) "off"
30) AC line
31) ...Closed when cabinet cover is open
32) check
33) charge
34) transmit
35) "coarse tuning"
36) ...V_{pp}
37) Power level attenuator
38) Extern. frequency control
39) Input (with SPM-3 Bu 301 connect to)
40) Level
41) Meter attenuator
42) Output
43) Meter reading is terminal voltage at Z_{out} = 0 and Z_{out} = Z
44) Meter
45) balanced
46) unbalanced
47) See test chart for details
48) All gain and level values for following op. condition: .... Z_{out} = 0 (...)

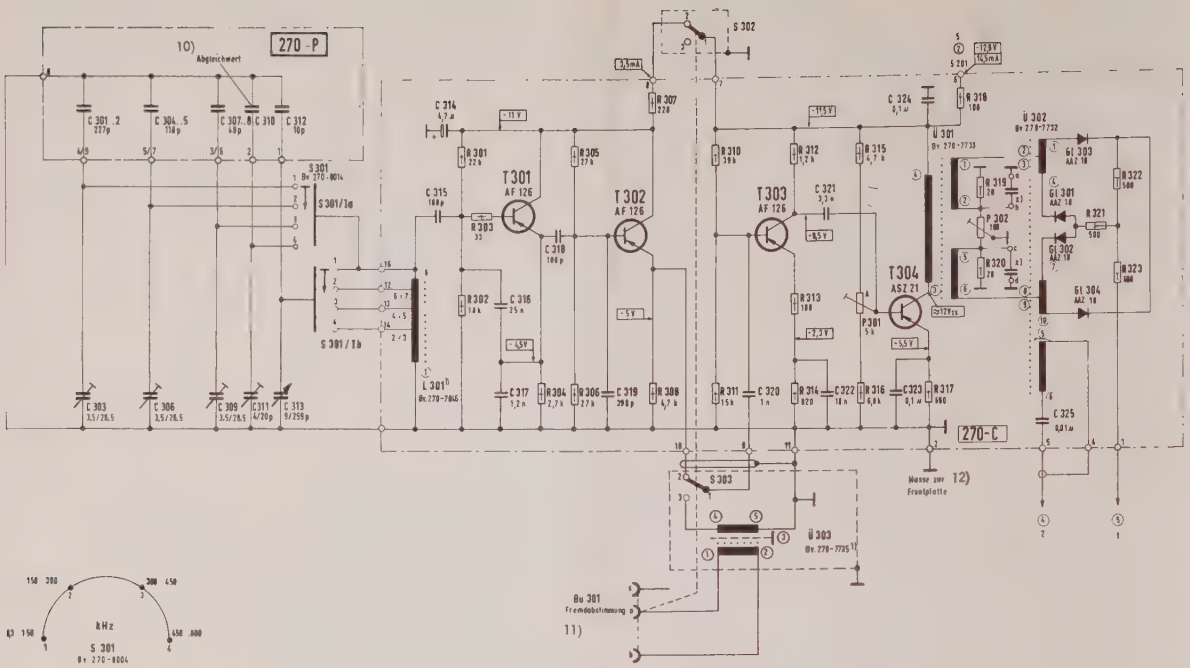
Blockschaltplan PS-3
Block Diagram BN 270

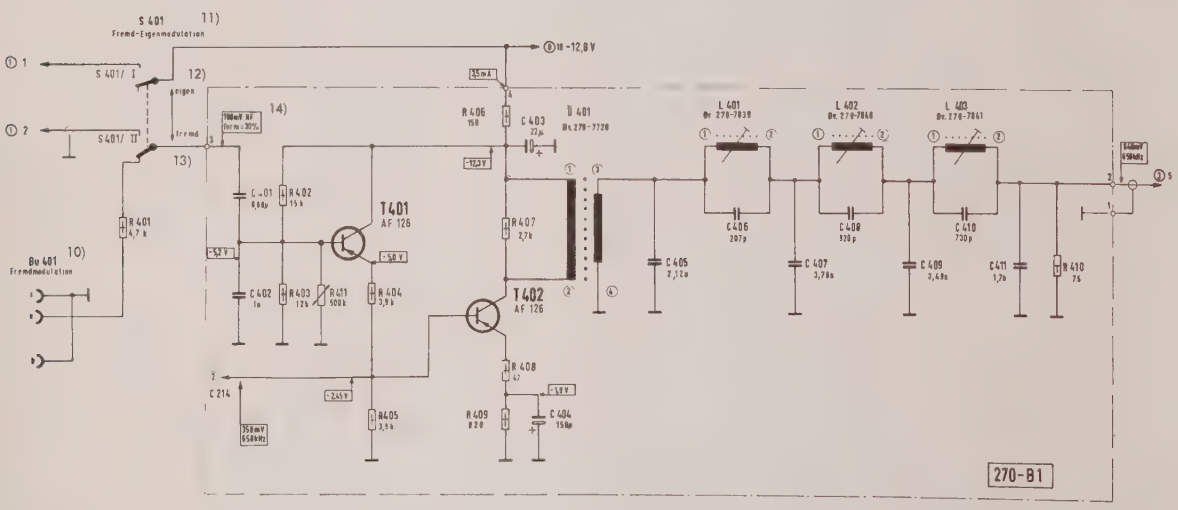
---

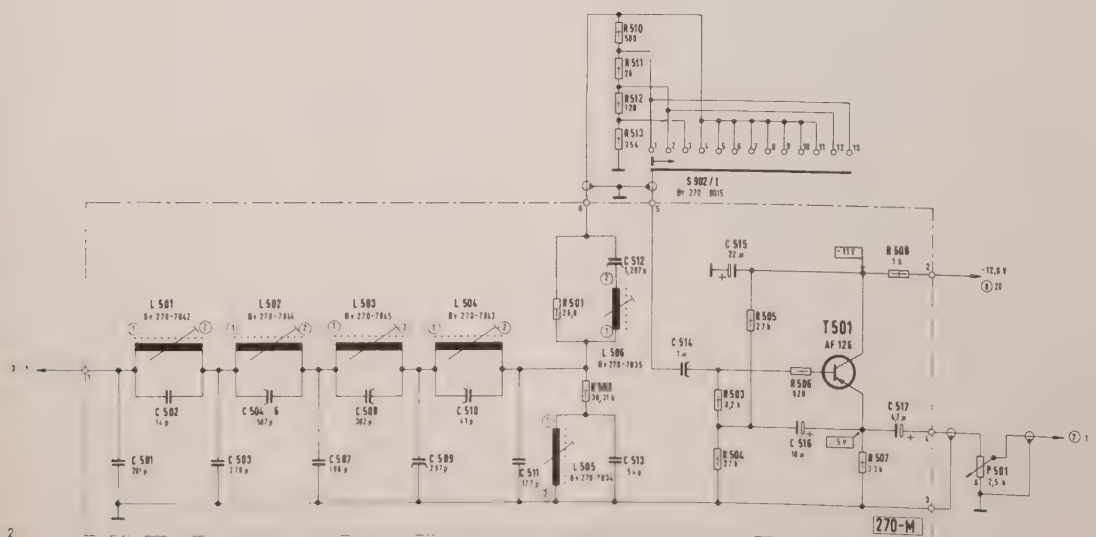
10) Gedr. Schaltung 270-B1 teilweise auf Stromlaufplan 4
11) Alle Gleichspannungen gegen Masse gemessen mit Instrument 100 kΩ/V
12) L 201 ist dabei kurzgeschlossen.

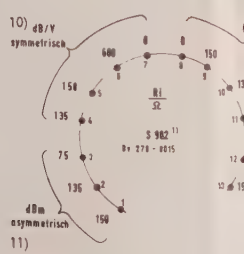
10) Printed circuit 270-B1 see circuit diagram (4)
11) All DC voltages are measured to chassis-ground with 100 kΩ/V meter
12) L 201 is thereupon short circuited

650-kHz-Signaloszillator PS-3
650 kHz Signal Oscillator BN 270 (2)









10) balanced
11) unbalanced

Abkürzungsbeispiele (Abbreviations examples):

(14) Y14 = Stromlaufplan 14 (Circuit diagram 14)

[375-M] = Leiterplatte M (Circuit board M)

Pkt. 6 = Anschlußpunkt 6 (Connection point 6)

TP 401 = Testpunkt 401 (Test point 401)

1)...9) = Anmerkungen (Notes)

10)... = Englische Übersetzung (English translation)

Farbkennzeichnung (Colour coding)

bl	blau	blue
blank	blank	bare wire
br	braun	brown
fl	farblos	transparent
ge	gelb	yellow
gn	grün	green
gr	grau	grey
rs	rosa	pink
rt	rot	red
Schirm	Schirm	screening
sw	schwarz	black
vio	violett	violet
ws	weiß	white
grrt	grau/rot	grey/red

geschirmte Leitung — Screened lead
blanker Draht — Bare wire

Belastbarkeit der Widerstände oder Größenbezeichnung nach DIN 44 050 ff

Resistor ratings or size corresponding to German Standard DIN 44 050 ff

Alle angegebenen Spannungen sind mit einem Instrument 100 kΩ/V gegen 0 V gemessen

All voltage ratings measured with respect to 0 V with 100 kΩ/V meter

Relais in Ruhestellung dargestellt
Relays shown in rest position

10 W 1/8 W 1/4 W 1/3 W 1/2 W 1 W

. Ziffern (roman numerals in excess of 1 W)

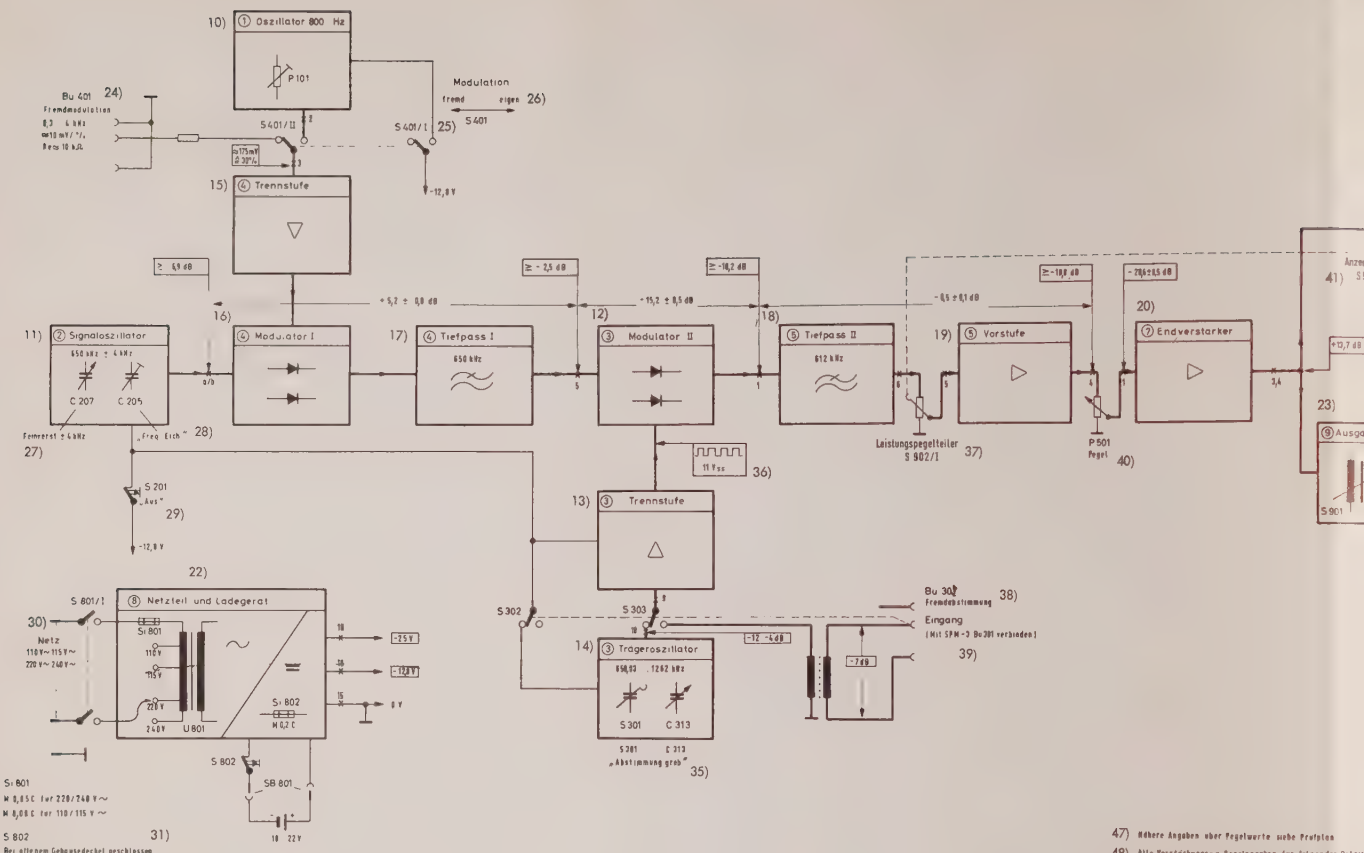
storen (Transistor equivalents)

elektron Bezeichnung
elektron designation

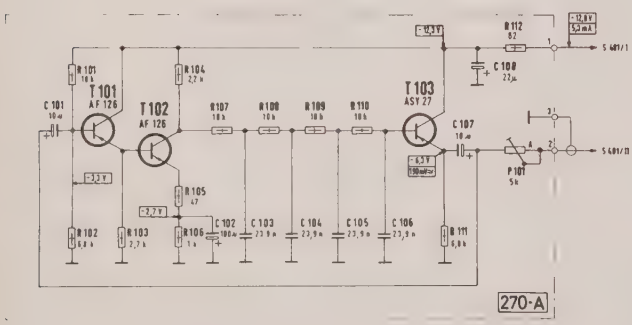
2 N 2222 / BFX 95
2 N 2368 / BSX 92
2 N 2369 / BSX 93
2 N 2484 / BFX 93 A
2 N 3964 / BFW 22

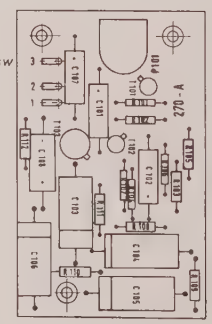
ter Bauelemente in den Stromlaufplänen
ieren, so sind stets die Angaben in den
dlich anzusehen.

components listed in the circuit diagrams
differ from another, those values given
valid.

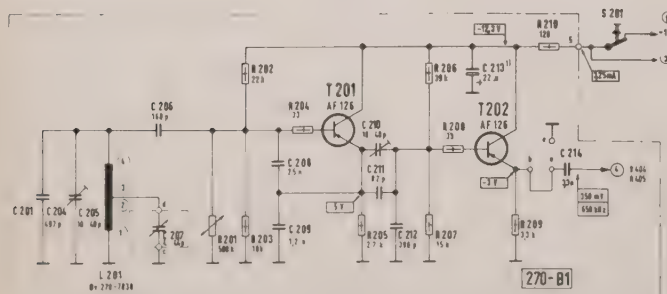


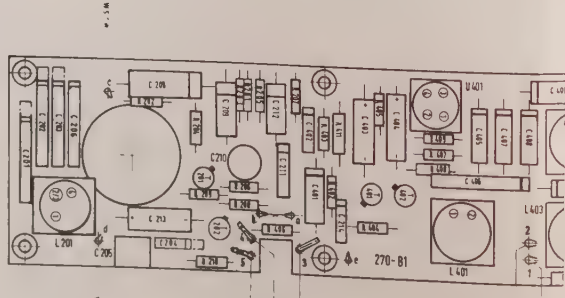
47) Höhere Angaben über Pegelwerte siehe Prüfplan
48) Alle Verstärkungs- u Pegelangaben für folgenden Betrie





10) All DC voltages are measured to chassis-p
11) Oscillator thereupon does not oscillate.



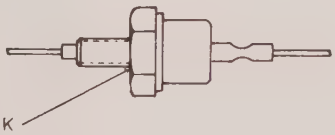


Dioden (Diodes)

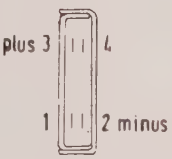
AAZ 10, AAZ 13, OA 182, ZP 6,8; ZPD 6,8; ZP 7,5; ZPD 7,5

K Farbpunkt (cathode colour marked)

Z 7, Z 6 (Z 12)

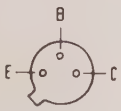


ZL 27



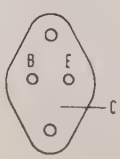
GI 801

Transistoren (Transistors)



ASY 27, ASZ 21, BSY 80, 2 N 2369/BSX 93,
2 N 1131/2 N 2905, 2 N 3251

AF 126



OC 35

Integrierte Schaltkreise (Integrated circuits)

1/20 W

ab 1 W rö

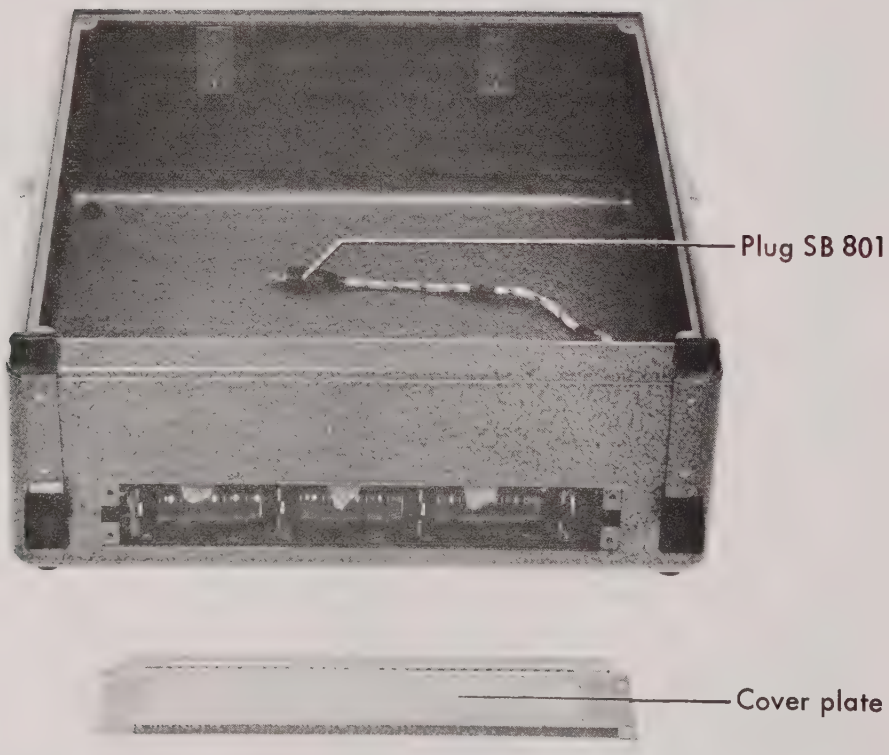
Äquivalenzliste für Trar

2 N Typ/äquivalente Pr
2 N Type/äquivalent Pr

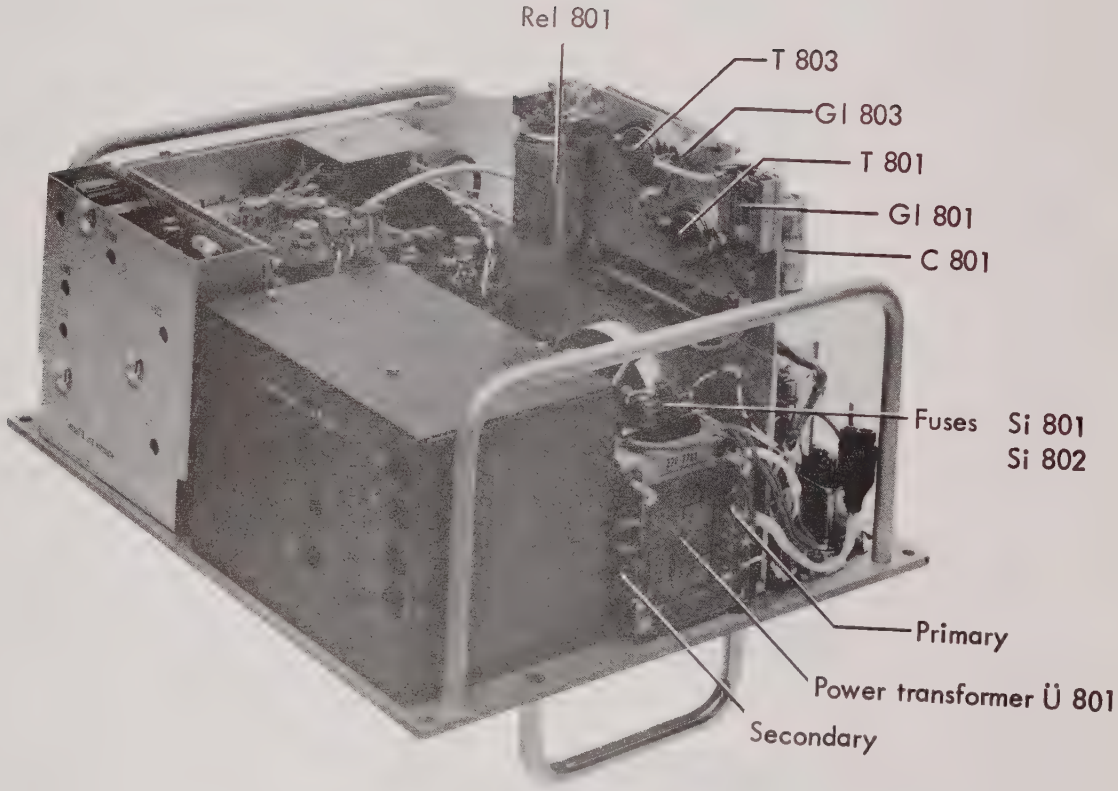
2 N 708 / BSX 88
2 N 918 / BFX 73
2 N 930 / BFX 93
2 N 1613 / BFX 69
2 N 1893 / BFW 33
2 N 2219 / BFX 97

Sollten die Werte bestim
und Schaltteillisten diff
Schaltteillisten als verb

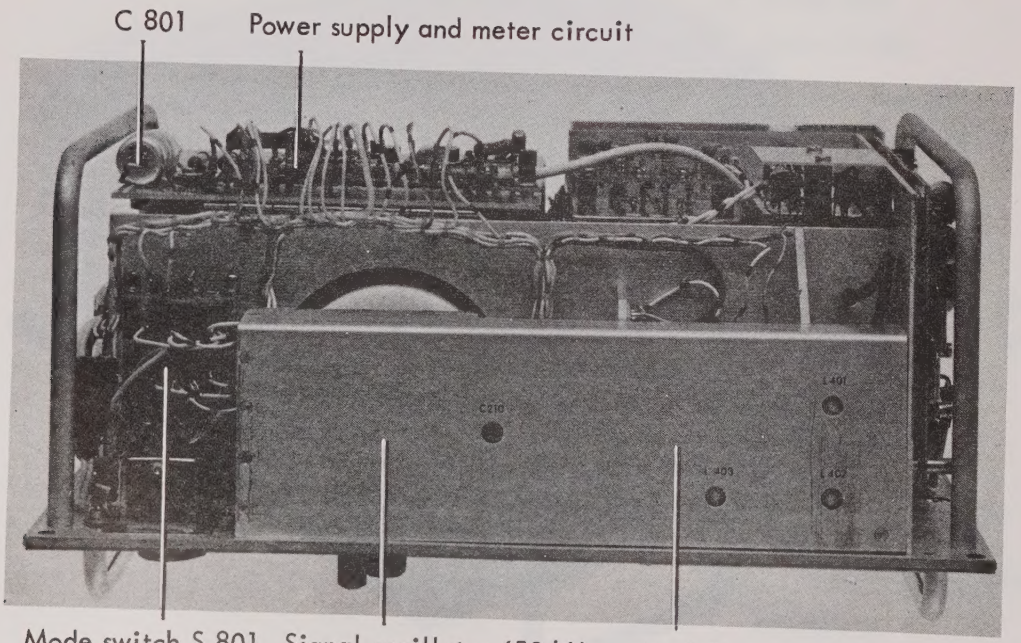
If the values of individu
and component lists sho
in the component lists a



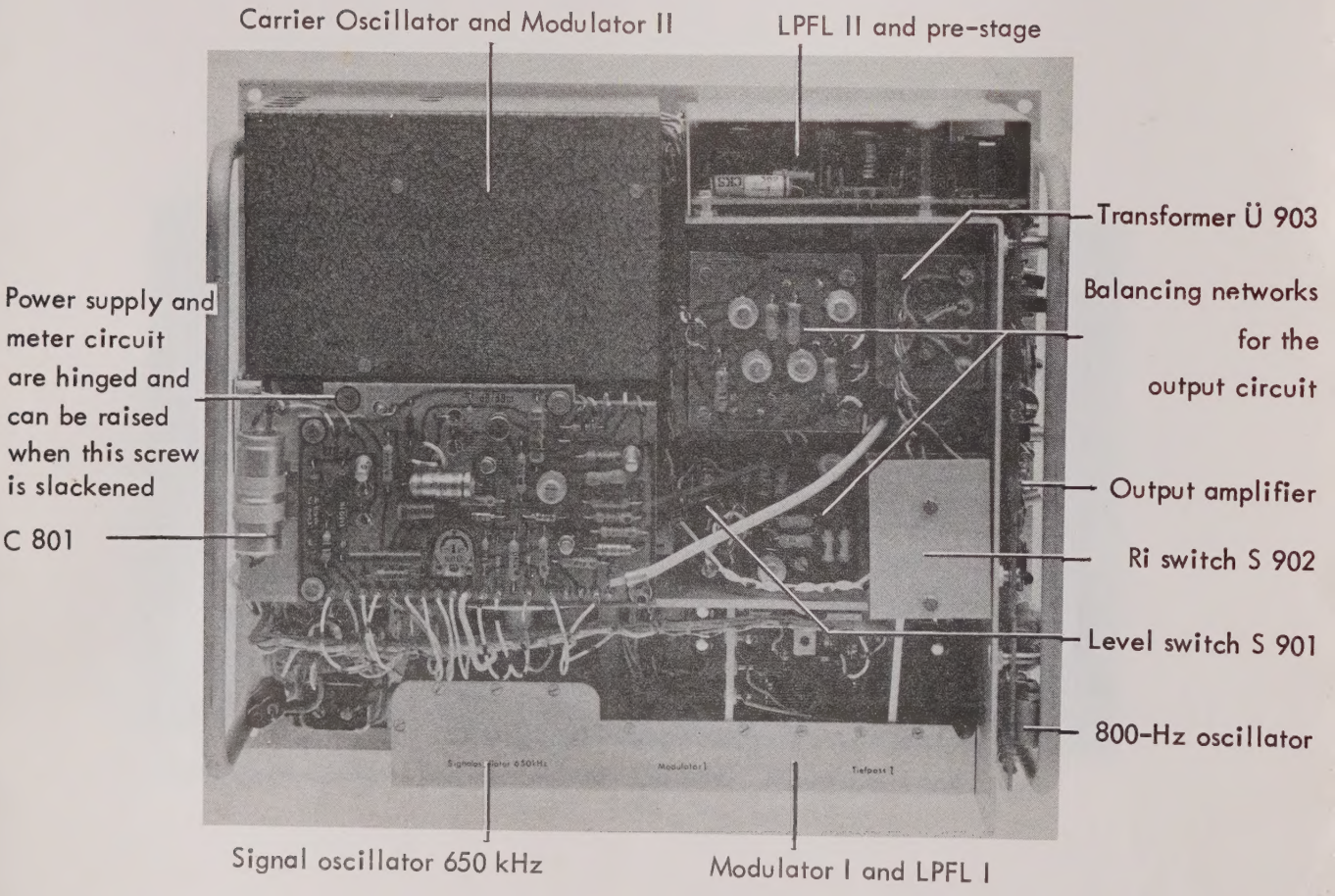
Position of the three batteries after removal of cover plate



View of interior when power supply and meter circuit are raised



View of the interior from underneath


Carrier Oscillator and Modulator II
LPFL II and pre-stage
Transformer Ü 903
Balancing networks for the output circuit
Power supply and meter circuit are hinged and can be raised when this screw is slackened
C 801
Output amplifier
Ri switch S 902
Level switch S 901
800-Hz oscillator
Signal oscillator 650 kHz
Modulator I and LPFL I

Rear view of the interior

MP MASTER
MA24480

Wandel u. Goltermann

7410 Reutlingen · Western Germany · Postbox 259